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**JOURNAL**

*of the*

**AMERICAN**

**VETERINARY MEDICAL**

**ASSOCIATION**

UNIVERSITY OF CALIFORNIA

APR 01 1941

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**78TH  
ANNUAL  
SESSION**

**INDIANAPOLIS  
AUGUST 11-15  
1941**

**VOLUME CVIII, NUMBER 769**

**APRIL 1941**

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# **Selective Service**

*from the "Corn States"  
point of view*

¶ "Corn States" approves the action of the medical, dental and veterinary professions in their efforts to maintain a sufficient service for the general population while building up the military and naval forces.

¶ Removing members of these professions from their civilian pursuits in large numbers would sacrifice the health of man and animals to a dangerous degree and thus incapacitate the other steps of preparedness.

¶ "Corn States" looks askance upon the drafting of veterinary practitioners into the military service for training as private soldiers and upon the taking of students from the veterinary schools before they have completed their studies, for the reason that the food supply needed for enduring national defense is thereby imperiled.

**The  
CORN STATES SERUM COMPANY  
Omaha**

# Journal of the American Veterinary Medical Association

600 S. Michigan Ave., Chicago, Ill.

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VOL. XCVIII

APRIL 1941

NO. 769

## Speedway Races to Be Feature of Indianapolis Convention

SPECIAL automobile races at the Indianapolis Speedway, scene of the famous racing classic each May 30, will provide many thrills for members of the Association and their wives who attend the 1941 convention, August 11-15.

The Committee on Local Arrangements for the "World's Largest Veterinary Convention" has announced that two 10-mile races and a 5-mile race will be staged at the Speedway on the afternoon of Thursday, August 14, in addition to a tire-changing contest. Nationally known drivers will participate in the events.

Among the other entertainment features

being planned are horse shows, the president's reception ball, the annual banquet and dance, alumni dinners, and luncheons and card parties for the ladies.

The Indianapolis Motor Speedway, considered the world's greatest race course, was built in 1909 by four Indianapolis men as a proving ground for automobiles. It was opened August 19, 1909, for three days of racing. The 1941 Decoration Day contest will be the 28th running of the 500-mile race, which has been staged every year except 1917 and 1918. Prize money awarded to winners in this classic now amounts to \$100,000.



Indianapolis Motor Speedway.

# INDIANAPOLIS HOTELS



OVER 7,000 rooms in 37 recognized hotels will be available to veterinarians and their guests attending the 78th annual convention in Indianapolis.

Because all activities at the "World's Largest Veterinary Convention" will take place in the Murat Theatre and Shrine Temple, there will be no headquarters hotel. The majority of those attending the convention, however, will stop at the nine well-known Indianapolis hotels which have been selected by the Committee on Local Arrangements as the most attractive and spacious. These hotels and their rates are:





- 1) Spink-Arms
- 2) Marott
- 3) Claypool
- 4) Antlers
- 5) Warren
- 6) Lincoln
- 7) Harrison
- 8) Severin
- 9) Washington

	Single	Double	Twin Beds
Antlers .....	\$2.50-4.00	\$4.00-5.00	\$4.50-6.00
Claypool .....	3.00-6.00	4.50-8.00	5.50-8.00
Harrison .....	2.50-4.00	4.00-6.00	5.50-6.00
Lincoln .....	3.00-6.00	4.50-8.00	5.00-7.00
Marott .....	3.00-up	6.00-up	6.00-up
Severin .....	2.50-4.00	4.00-6.00	5.00-7.00
Spink-Arms .....	2.50-6.00	4.00-7.00	
Warren .....	2.50-3.50	4.00-6.00	5.50-6.00
Washington .....	2.50-4.00	4.00-6.00	5.50-6.00

of the Murat Temple, and are the ones most commonly used by convention-goers.

In addition, visitors whose friends are members of the Columbia Club, a new, modern, ten-story building in the heart of the city, or the Indianapolis Athletic Club, may secure rooms in either of these buildings. The rates at the Columbia Club are \$3.00-\$4.50 for a single room and \$5.00-\$7.00 for a double room; at the Athletic Club, \$2.50-\$4.00 for a single room and \$6.00 for a double room.

Many smaller hotels with lower rates also will be available.

All of the above-mentioned hotels are located in the downtown business area, within walking distance

## Field Experiments in Bang's Vaccination \*

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ARTIFICIAL immunization against Bang's disease in cattle is by no means a recent development. Bang,<sup>1</sup> in 1897, wrote of the possibilities of immunizing cattle against infectious abortion, and in 1906 published the results of his own experiments on injecting nonpregnant animals with both living and killed cultures of *Brucella abortus*. The results obtained, especially on the use of living cultures, he considered very encouraging.

Other important workers in this field at about that time were McFadyean and Stockman.<sup>2</sup> They also used both living and killed cultures and agreed, with Bang, that suspensions of viable organisms produced a greater resistance to the disease than bacterins. They based their conclusion on a series of 493 treated animals in which the abortion rate was 6.5 per cent as compared with 432 controls in which the abortion rate was 23.4 per cent.

U. S. Bureau of Animal Industry investigations on vaccination began in 1917. Experiments were conducted in the field on 1,141 animals in various herds and also on 23 animals kept under close surveillance at the laboratory. The work was reported by Buck and Creech.<sup>3</sup> Of 772 unbred cows and heifers vaccinated with living *Br. abortus*, 13.1 per cent terminated their later pregnancies by aborting while 369 animals used as controls had an abortion rate of 17.7 per cent.

Of the smaller group, eight heifers and three cows were injected subcutaneously with abortion vaccine when nonpregnant, four heifers received abortion bacterin, and

six heifers and two cows were used as controls. All of these animals were exposed by feeding variable amounts of stomach contents from aborted feti that were known to contain *Br. abortus*. Of the eleven receiving vaccine, ten produced normal calves. In the group receiving bacterin, two out of four aborted, and seven of the eight controls aborted.

Smith and Little<sup>4</sup> also began their work in 1917, and reported favorably on the use of living and heat-killed cultures.

Beginning with the work of Hart and Traum<sup>5</sup> (1925), it was realized that the injection of a vaccine consisting of a virulent strain of *Br. abortus*, although conferring a desired degree of resistance to the disease, was attended with considerable danger. These workers reported that after administering vaccine to 16 open lactating cows, ten were later found to be eliminating the organism in their milk.

Many investigators about this time attempted to produce an avirulent strain vaccine. Giltner, Huddleson, Clark and Schlingman<sup>6</sup> recorded the results obtained between 1920-1929 by the use of an avirulent strain vaccine on a large number of animals in the field. Three groups consisting of 1,212 animals had been treated and 1,258 left as controls. The average abortion rate in the group of treated animals was 3.6 per cent and in the untreated group, 18.4 per cent. These experiments were conducted on animals without regard to age.

\*Smith, T., and Little, R. B.: Studies in vaccinal immunity toward diseases of the bovine placenta due to *Bacillus abortus* (infectious abortion). Rockefeller Inst. Med. Res. Mono. 19 (1923), pp. 124.

<sup>5</sup>Hart, G., and Traum, J.: The relation of subcutaneous administration of living *Bacterium abortum* to the immunity and carrier problem of bovine infectious abortion. California Agr. Exp. Sta. Tech. Paper 19 (1925), 50 pp.

<sup>6</sup>Giltner, W., Huddleson, I. F., Clark, L. T., and Schlingman, A. S.: Results from the use of Huddleson's vaccine for Bang's disease. J.A.V.M.A., lxxvi (May 1929), pp. 885-891.

\*Presented before the Section on Research at the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

<sup>1</sup>Bang, B.: Infectious abortion of cattle. J. Comp. Path. & Ther., xix (1906), pp. 191-202.

<sup>2</sup>McFadyean, J., and Stockman, S.: Epizootic abortion in cattle. Dept. Comm. Rpt. Bd. Agr. & Fisheries, Great Britain (1909), p. 43.

<sup>3</sup>Buck, J. M., and Creech, G. T.: Studies relating to the immunology of bovine infectious abortion. J. Agr. Res., xxviii (1924), pp. 607-642.

In 1936, Meyer and Huddleson<sup>7</sup> again reported on the use of an avirulent vaccine that had been changed so that after "large and repeated doses of the living organism the animals remained negative to the agglutination test." In a group of 55 herds, 4,539 animals were vaccinated and 1,255 left as controls. He concluded that 10 per cent of the vaccinated animals did not develop sufficient immunity to last one year, although "there was a significant difference between the incidence of infection in the vaccinated animals and those in the control group."

In 1929, Cotton, Buck and Smith<sup>8,9,10</sup> began a long series of experiments with several avirulent strains of *Br. abortus* from which strain 19 was selected as the most promising. These investigators in several articles reported desirable results following the vaccination of calves but did not recommend the vaccination of older animals.

Meanwhile, field experimentation on a large scale, beginning in 1934, came into being.

Butler, Warren and Marsh<sup>11</sup> (1936) reported on calfhood vaccination of animals under range conditions. There were 415 heifers in a heavily infected herd, 295 of which were vaccinated and the remaining ones left as controls. Although they drew no conclusions concerning the amount of resistance built up in their vaccinated stock, they showed that heifers vaccinated at 4 to 12 months of age returned to a negative status much more quickly than those vaccinated when over 12 months of age.

<sup>7</sup>Meyer, D. B., and Huddleson, I. F.: The vaccinal immunization of cattle for Bang's disease. Mich. Agr. Exp. Sta. Tech. Bull. No. 153 (1936), pp. 25.

<sup>8</sup>Cotton, W. E.; Buck, J. M.; and Smith, H. E. Studies of five *Brucella abortus* (bovine) strains as immunizing agents against Bang's disease (infectious abortion). J.A.V.M.A., lxxxv (Aug. 1934), pp. 232-247.

<sup>9</sup>*Ibid.*: Efficacy and safety of abortion vaccines prepared from *Br. abortus* strains of different degrees of virulence. J. Agr. Res., xlv (1933).

<sup>10</sup>Cotton, W. E.: Vaccination against Bang's disease. Rpt. Conf. on Bang's Disease of the North Atlantic States (1937), pp. 24-30.

<sup>11</sup>Butler, W. J., Warren, D. M., and Marsh, H.: Experimental vaccination of range calves with a living culture of *Brucella abortus*. I. Results of agglutination tests made at intervals of three years following vaccination. J.A.V.M.A., lxxxix (Aug. 1936), pp. 163-168.

Stevens<sup>12</sup> (1938) reported on a coöperative vaccination program in which calfhood vaccination was undertaken in 130 herds, consisting of 5,970 cattle, as a means of "eliminating Bang's disease in herds that were too heavily infected to warrant application of the test and slaughter plan." Of the 1,027 cattle vaccinated, the abortion rate in over 200 calvings was indicated as 1.5 per cent.

Hardenbergh<sup>13</sup> reported in 1939 on a series of 625 heifers vaccinated between the ages of 4 and 9 months. Eighty per cent became completely negative to the agglutination test within four to six months. Twenty per cent maintained a low titer indefinitely, and one remained positive indefinitely. Of 124 pregnancies in vaccinated heifers, there were 5.6 per cent abortions and 2.4 per cent of these were due to *Br. abortus*. In the control group 6.2 per cent of the abortions were caused by *Br. abortus*.

Haring<sup>14</sup> (1939) recorded the results obtained by the use of strain 19 on 641 calves and heifers. Of 1,001 pregnancies of these animals there was an abortion rate of 3.9 per cent. Haring also reported on the eradication of brucellosis from a badly infected dairy herd by the use of calfhood vaccination over a period of six years.

Wight,<sup>15</sup> U. S. Bureau of Animal Industry, reported that since 1936, 13,000 calves in 260 herds have been vaccinated. Of these animals, 2,950 have completed their first gestation, 625 their second and 60 their third.

More recently Tompkins<sup>16</sup> (April 1940) reported the results of vaccination on 708 calves. Pregnancies in 391 of the vacci-

<sup>12</sup>Stevens, J. D.: Report of the first year's progress of the Olympic Peninsula Dairyman's Association Bang's disease project on calfhood vaccination. No. Amer. Vet., xix (1938), pp. 35-39.

<sup>13</sup>Hardenbergh, J. G.: Calfhood vaccination against Bang's disease: I. Effect on agglutination titers and results of first pregnancies. J.A.V.M.A., xciv (May 1939), pp. 479-488.

<sup>14</sup>Haring, C. M.: Results from vaccination of heifers and calves against Bang's disease. Certified Milk, xiv, No. 164, pp. 9-19.

<sup>15</sup>Wight, A. E.: Present status of federal-state Bang's disease program. Proc. U.S. Live Stock San. Assn. (1939), pp. 28-35.

<sup>16</sup>Tompkins, L. J.: The experience of nearly six years with calfhood vaccination. Cornell Vet., xxx (1940), pp. 178-192.



nated animals resulted in 17 clinical abortions.

#### REASONS FOR INVESTIGATION

In the conduct of the federal-state co-operative work for the control of Bang's disease, eradication by the test-and-slaughter plan has been accomplished in a large majority of cases. Instances were found, however, where it was extremely difficult to eradicate the infection although consistent, conscientious efforts were made. In some of these, residual infection persisted on the premises and in others *Br. abortus* was reintroduced from known or unknown sources. Infected barns, paddocks, poorly drained pastures, the proximity to infected herds and similar sources of danger presented varying problems.

Purebred herds having blood lines difficult or impossible to replace may suffer irreparable loss through strict adherence to the test-and-slaughter method of eliminating Bang's disease. Highly bred grade herds to a lesser degree face the same problem. In heavily infected commercial herds it is often difficult if not impossible for the owner to stay in business if he loses a large portion of his herd at one time.

The loss of desirable blood lines or heavy financial loss while establishing a Bang-negative herd indicated the desirability of supplementing the test-and-slaughter method by some practical but less drastic procedure. It was in the hope that vaccines might be of assistance in solving many of these complex problems that this investigation was undertaken.

#### PROCEDURE

When the project was begun in 1934, it was decided to take under supervision herds of different types to simulate, as far as possible, average field conditions. Herds under supervision, therefore, range from the elaborate purebred breeding farm to the ordinary small dairy herd of 15 to 20 grade cows. Included also is a herd of beef cattle. The percentage of reactors in the eleven herds reported upon varied from 6.5 per cent to 100 per cent with an average of 36.2 per cent.

At the outset, heifers of all ages were vaccinated in an effort to determine which age group would be most suitable for vaccination; that is, at which age an animal would obtain a maximum resistance and still not retain a positive titer for a prolonged time.

Different commercial vaccines were used at the start, but in an effort to establish uniformity of procedure, since 1935 only strain 19 vaccine prepared by the U. S. Bureau of Animal Industry has been injected. This consists merely of a suspension of live *Br. abortus* organisms of low virulence in a saline solution standardized so that each 5-cc. dose contains from 6 to 7 billion viable organisms.

The owners were allowed, and even encouraged, to keep their reactors until they no longer were profitable. No precautions were taken to keep the vaccinated animals from association with the adult reactors. In many cases vaccinated animals, during their lactation periods, were placed in the milking line with a reactor on each side. In some instances vaccinated calves showing a blood titer of at least 1:200 were in direct association with negative susceptible animals and in no instance did the latter show any change in their negative titers.

Calves were blood-tested before vaccination to determine their blood titers. The vaccine was injected subcutaneously at the point of the shoulder and usually a large swelling developed which subsided in about ten days or less. We have had no cases in which the calves have shown clinical illness following vaccination. The animals were usually bled two weeks following vaccination, and then at three-month intervals. Blood-serum tests were set up in dilutions of 1:25, 1:50, 1:100 and 1:200. Animals showing complete agglutination in dilutions of 1:100 or higher were recorded as positive while those showing a complete agglutination in dilutions of 1:25 or reacting between this and 1:100 were considered as being suspicious of having Bang's disease.

#### AGGLUTINATION RESPONSE

Although up to the present time 1,170 animals in 19 herds have been vaccinated,



TABLE I—Animals Vaccinated When 3 to 8 Months of Age

AGE WHEN VACCINATED (MONTHS)		3	4	5	6	7	8	TOTAL
NUMBER VACCINATED		2	139	156	180	74	91	642
TIME FOR TITER TO DISAPPEAR (MONTHS)	3		13	28	8	4	6	59 (9.19%)
	6	2	117	109	130	34	58	450 (70.1%)
	9		7	13	30	15	11	76 (11.83%)
	12		1	4	5	5	10	25 (3.9%)
	18					1		1 (.155%)
	Over 18					1		1 (.155%)
REMAIN POSITIVE				1	1	5	2	9 (1.4%)
REMAIN SUSPICIOUS			1	1	6	9	4	21 (3.27%)

this report will concern itself only with 796 animals in eleven herds vaccinated prior to July 1, 1939. The remaining 374 animals have not been included in this report as they have been on experiment an insufficient length of time to permit definite conclusions.

Two weeks following vaccination when the calves were bled it was found that the great majority were positive to the agglutination test in all four dilutions used. Occasionally an animal was discovered which remained negative after vaccination. We found two such animals which failed to produce any blood titer even after repeated

vaccinations and they have consistently remained negative. The 796 animals in the experiment were divided into three age groups: group I, those vaccinated at 3 to 8 months of age; group II, those vaccinated at 9 to 12 months of age; and group III, those vaccinated at 13 to 21 months of age.

As shown in table I, 642 animals between the ages of 3 and 8 months were vaccinated. A completely negative titer was found in 79.2 per cent of these animals within six months, 91.1 per cent within nine months and 95.1 per cent after 18 months following vaccination. Of the remaining 4.82 per cent which still showed a titer, 3.42 per

TABLE II—Animals Vaccinated When 9 to 12 Months of Age

AGE WHEN VACCINATED (MONTHS)		9	10	11	12	TOTAL
NUMBER VACCINATED		27	19	21	22	89
TIME FOR TITER TO DISAPPEAR (MONTHS)	3					
	6	11	4	6	5	28 (31.46%)
	9	8	6	2	1	17 (19.1%)
	12	3	3	2	6	14 (15.73%)
	18		1	1	3	5 (5.62%)
	Over 18					
REMAIN POSITIVE		1	3	1	1	6 (6.74%)
REMAIN SUSPICIOUS		4	2	7	6	19 (21.35%)

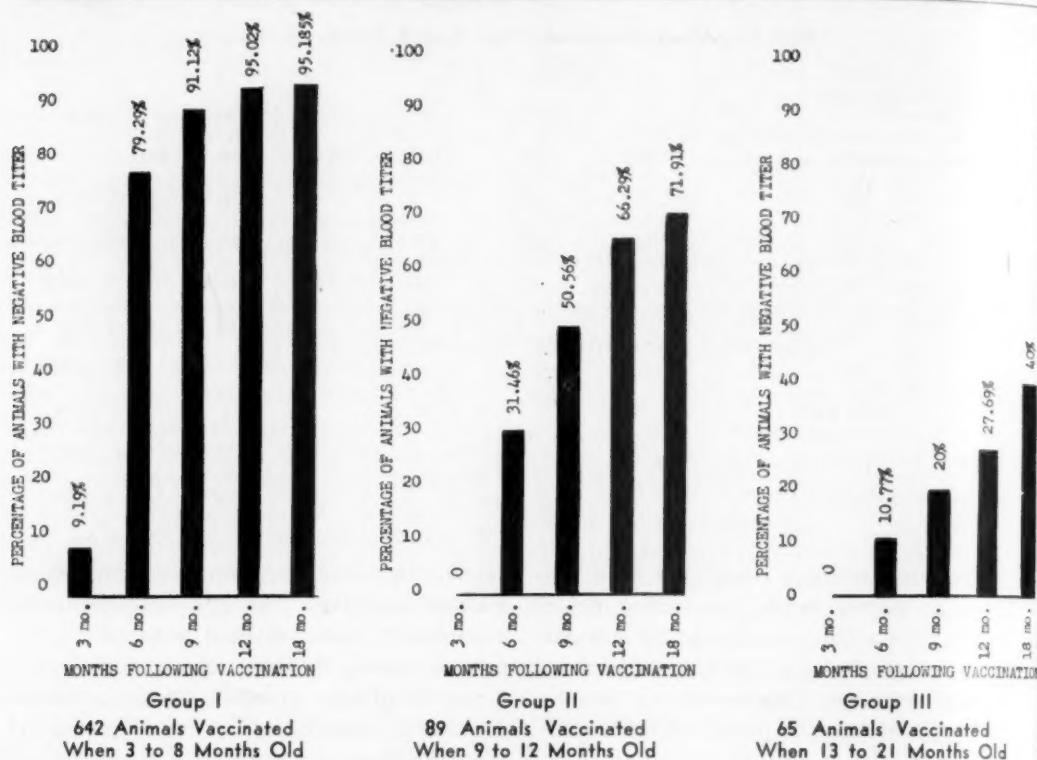


Fig. 1.

Group I: 4.825 per cent showed blood titer 18 months after vaccination. 1.4 per cent were positive; 3.425 per cent were suspicious.  
 Group II: 28.09 per cent showed blood titer 18 months after vaccination. 6.74 per cent were positive; 21.35 per cent were suspicious.  
 Group III: 60 per cent showed blood titer 18 months after vaccination. 20 per cent were positive; 40 per cent were suspicious.

cent were suspicious while 1.4 per cent remained positive in a dilution of 1:100 or more.

In table II is shown the results obtained by the vaccination of 89 animals between the ages of 9 and 12 months; 50.56 per cent returned to a negative status within nine months and 71.9 per cent after 18 months following vaccination. Of the remaining 28.09 per cent still showing a blood titer, 6.74 per cent were positive and 21.35 per cent were suspicious.

In the last group, table III, there were 65 animals vaccinated between the ages of 13 and 21 months. A completely negative titer was found in 10.77 per cent within six months; 20 per cent within nine months and 40 per cent 18 months following vaccination. Of the remaining 60 per cent still showing a titer, 40 per cent were suspicious

and 20 per cent were still reactors. It should be recorded, however, that of the 26 animals in this group remaining suspicious, ten later became completely negative. A comparison of results of the three groups (fig. 1) shows marked differences in the length of time necessary for agglutinins to disappear.

Percentage of Animals With Negative Blood Titer			
Months Following Vaccination	Group I	Group II	Group III
3	9.19	....	....
6	79.20	31.46	10.77
9	91.12	50.56	20.00
12	95.00	66.29	27.69
18+	95.00	71.91	40.00

Assuming that animals are to be bred at approximately 18 months of age, 95 per cent of group I would be negative at that time while about 50 per cent of group II and

TABLE III—Animals Vaccinated When 13 to 21 Months of Age

AGE WHEN VACCINATED (MONTHS)		13	14	15	16	17	18	Over 18	TOTAL
NUMBER VACCINATED		8	13	11	10	6	11	6	65
TIME FOR TITER TO DISAPPEAR (MONTHS)	3								
	6	1	2	1	1	1	1		7 (10.77%)
	9	4	1	1					6 (9.23%)
	12		3	2					5 (7.69%)
	18		1	3		1	3		8 (12.31%)
	Over 18			3	2	1	3	1	10 (15.38%)
REMAIN POSITIVE		1	2		3	1	4	2	13 (20.00%)
REMAIN SUSPICIOUS		2	4	1	4	2		3	16 (24.62%)

none of group III would be negative. In this experiment, however, all animals were bred regardless of their blood titer and little, if any, difference could be noted in breeding efficiency or calving results.

Of the 796 calves tested in this project, only 13, or 1.66 per cent, showed a positive or suspicious titer prior to vaccination. It is the general understanding that those animals showing such titers take a greater length of time to become negative following vaccination. Data which we have accumulated on this subject do not seem to bear out this belief (table IV).

In table V there is shown a group of nine animals in the experiment which returned to a positive status following two or more clean blood tests. Four animals of this group were definitely proved to be infected, as shown by the isolation of the organism from the milk.

#### PREGNANCIES

We have now a record of 640 calvings of animals vaccinated as shown in groups I, II and III which represent: 172 cows having had one calf; 90 having had two calves; 48 having had three calves; 26 having had four calves; and 8 having had five calves.

Ten of these calvings, or 1.5 per cent, terminated in abortions. As shown in

table VI, five of the animals in which abortions occurred were vaccinated between 12 and 18 months of age and in four of these a commercial vaccine was used which was reported to have contained a virulent strain of *Br. abortus*.

We were not able to culture the after-birth in any of these cases, but according to the agglutination titers following these abortions, five of these animals were posi-

TABLE IV—Time Required for Animals Having Pre-vaccination Titer to Become Negative Following Vaccination

AGE WHEN VACCINATED (MONTHS)	PRE-VACCINATION TITER	MONTHS REQUIRED TO BECOME NEGATIVE
4	+ P --	6
4	+ P --	6
4	++ --	1
4	++ P --	6
4	++++	12
5	+++ --	3
5	++++	6
6	+ P --	Still ++ -- two yrs. following vacc.
6	+ ---	6
7	+ P --	8
8	++ --	6
12	+ P --	12
14	+++ P	8

TABLE V—Positive Reactions in Vaccinated Animals Following Two or More Negative Tests

ANIMAL NUMBER	AGE WHEN VACCINATED (MONTHS)	VACCINE USED	MONTHS TO BECOME NEGATIVE AFTER VACCINATION	YEARS TO BECOME POSITIVE AFTER VACCINATION	ABORTIONS AND CALVINGS	BR. ABORTUS IN MILK	REMARKS
431	17	Commercial	20	4½	4 normal calves	Negative	
22595	12	Commercial	12	3½	4 normal calves		Became negative 4 mo. after becoming positive; remained negative since
157	3	Commercial	6	3	3 normal calves	Positive	
173	4	Commercial	6	3	Aborted 3rd calf; 4th normal	Negative	Became positive following abortion
141	8	Commercial	6	3	4 normal calves	Positive	
257	4	BAI strain 19	9	1½	2 normal calves	Positive	
68305	6	BAI strain 19	12	3½	1st normal; aborted 2nd		Became positive following abortion
68615	9	BAI strain 19	12	2½	1 dead calf		Became positive following delivery of dead calf
54125	12	BAI strain 19	18	3½	Aborted 2nd; 3rd calf normal		Became positive following abortion

TABLE VI—Abortions in Vaccinated Animals

ANIMAL NUMBER	AGE WHEN VACCINATED (MONTHS)	VACCINE USED	CALF ABORTED	BLOOD TITER AT ABORTION	NORMAL CALVES FOLLOWING ABORTION	BR. ABORTUS IN MILK
455	14	Commercial	2nd	++++	Sold	
463	19	Commercial	1st	+=	1	
112	18	Commercial	3rd	+=	2	
22588	17	Commercial	3rd	++++	1	Negative
156	3	Commercial	1st	+=	3	Negative
173	4	Commercial	3rd	+=	1	Negative
206	4	BAI strain 19	2nd	+=	1	
68305	6	BAI strain 19	2nd	+++ P		
54125	12	BAI strain 19	2nd	++++	1	Positive
66742	4	BAI strain 19	2nd	+=		Negative

tive. Milk samples drawn from five of the animals were examined for the presence of *Br. abortus* and one was found to be positive. The organism recovered did not resemble strain 19 in its cultural characteristics. Five of the abortions occurred during the second pregnancy, three during the third and two during the first pregnancy.

#### THE DETERMINATION OF UDDER ELIMINATION OF BR. ABORTUS

Since *Br. abortus* may cause undulant fever in man, it is important from a public health standpoint to determine whether or not the organisms used in the Bang vaccine will become established in the udders of the vaccinated animals. With that object in mind, we conducted some work to determine whether or not vaccinated heifers shed *Br. abortus* in the milk during lactation.

Quarter samples from 77 vaccinated animals were cultured directly on potato-agar plates and the whey was tested for the presence of agglutinins. Guinea pigs were inoculated and after six weeks were autopsied. Their spleens, testicles and livers were cultured for the presence of *Br. abortus*. The organism was found in the milk of five of these 77 animals as evidenced by the recovery of the organism from the guinea pigs and in two cases it was also isolated directly from the milk. Three of the five animals, Nos. 4, 6 and 9, were vaccinated in 1934 with 10 cc. of a commercial vaccine which was at that time reported to contain virulent *Br. abortus*. In neither of the two positive cases vaccinated with strain 19 did the isolated organism resemble strain 19 either in its cultural characteristics or action on guinea pigs.



A detailed description of each of the five positive cows follows:

*Cow 4.*—This animal was vaccinated at 16 months of age and never carried a blood titer of less than 1:50. At the time the milk samples were drawn she had returned to a titer of 1:200 and remained that way for three tests over a period of two years. This cow had three apparently normal calves. The blood of guinea pigs inoculated with the cream from the right front and right hind quarters was positive in a dilution of 1:200 on test. *Br. abortus* was recovered from spleens of both.

*Cow 36.*—This cow was vaccinated at the age of 3 months and after a post-vaccination titer of ++++ she quickly returned to negative and remained that way for two years. On November 12, 1937, she was bled and found to be positive in a 1:200 dilution. Her blood picture for three subsequent bleedings over a period of two years remained positive in 1:200 dilutions. Each quarter produced high blood titers and enlarged spleens in guinea pigs. One quarter sample also produced large abscessed testicles in its corresponding guinea pig. *Br. abortus* also was recovered directly from the milk. This animal had three apparently normal calves.

*Cow 9.*—This animal was 8 months old when vaccinated and, as in the previous case, returned to a negative status following vaccination and remained in that category for two years. In November, 1937, her blood titer became positive where it has since remained. Quarter milk samples were drawn and it was found that the milk from the right hind quarter contained Bang's bacilli. This milk produced enlarged spleens and abscessed testicles from which the organisms were recovered in pure culture. This cow has had four apparently normal calves.

*Cow 20.*—This animal was vaccinated at the age of 4 months with strain 19 vaccine. She returned to a negative status within six months following vaccination and remained that way for approximately a year. A month following

her first calving, which was apparently normal, she was bled and found to be positive in a dilution of 1:200. She remained positive for a year and a half during which she had a second apparently normal calf. Virulent *Br. abortus* organisms which did not resemble strain 19 were recovered from guinea pigs inoculated with milk from all four quarters.

*Cow 10.*—This animal was vaccinated in 1935 at the age of 12 months with strain 19 vaccine and she passed three clean blood tests over a period of two years. She aborted her second calf after an apparently normal first calving. Her blood titer became positive and has since remained in that category. She calved normally 13 months following the abortion. Milk samples from this individual produced enlarged spleens in guinea pigs from which *Br. abortus* was isolated. The organisms were also isolated directly from the milk but they did not resemble strain 19.

Ten of these 77 samples were drawn from lactating animals that were vaccinated as adults with strain 19. This group is interesting because it would seem that when an adult cow is vaccinated during lactation the possibility of the vaccine infecting the udder is much greater than when the vaccine is used on calves with undeveloped mammary glands. All ten of these samples were negative.

#### PRESENT STATUS OF EXPERIMENTAL HERDS

After an average period of about four years under the calfhood-vaccination plan, the total number of adult animals in the eleven experimental herds has increased from 596 to 686. The percentage of reactors has been reduced from an average of 36.2 to 8. Three of the herds are now completely negative, having replaced their reactors with vaccinated animals of their own

TABLE VII—Status of Experimental Herds After 5½ Years of Calfhood Vaccination

HERD No.	NO. IN MILK HERD AT BEGINNING OF EXPERIMENT	NO. OF REACTORS IN MILK HERD AT BEGINNING OF EXPERIMENT	YEARS VACCINATING	NO. NOW IN MILK HERD	NO. OF REACTORS NOW IN MILK HERD	NO. VACCINATED ANIMALS NOW IN MILK HERD	NO. OF REACTORS NOW IN VACCINATED GROUP
1	145	46 (31.00%)	5½	118	7 (5.9%)	87 (74.0%)	2 (2.2%)
2	32	12 (37.5%)	5	66	0	16 (24.2%)	0
3	11	11 (100%)	4½	11	1 (9.1%)	11 (100%)	1 (9.1%)
4	104	50 (48.0%)	5	96	0	64 (66.6%)	0
5	39	16 (41.0%)	4½	57	11 (19.2%)	30 (52.6%)	0
6	48	17 (35.4%)	4½	55	3 (5.4%)	38 (69.0%)	0
7	45	7 (15.5%)	4	58	5 (8.6%)	17 (29.3%)	1 (5.8%)
8	61	4 (6.5%)	4	98	0	33 (33.6%)	0
9	35	12 (34.2%)	4	36	5 (13.8%)	10 (27.7%)	0
10	36	20 (55.5%)	4	45	13 (28.8%)	18 (40.0%)	0
11	40	21 (52.5%)	2½	46	10 (21.7%)	10 (21.7%)	0
Total	596	216 (36.2%)		686	55 (8.0%)	334 (48.9%)	4 (1.1%)

raising. Exclusive of young stock, there are now 334 vaccinated animals, or 48.9 per cent of the total number in these herds. This group of 334 animals exceeds the 216 reactors formerly in the herds at the beginning of the experiment, but since the owners retained their reactors until unprofitable a residue of 55 old reactors still remains.

#### SUMMARY

An investigation was started over five years ago in eleven herds to determine the value of *Brucella abortus* vaccines in the control or eradication of Bang's disease. Herds used for the experiment were of all types and breeds and the reacting animals constituted 6.5 per cent to 100 per cent, or an average of 36.2 per cent, of the individuals in the group with which they were associated. The owners were allowed and encouraged to keep their reactors until they became unprofitable or until vaccinated replacements were available. In 1934, commercial vaccines were used in three herds but since that time only strain 19 vaccine furnished by the U. S. Bureau of Animal Industry has been employed.

This project covered three age groups of which 642 were vaccinated between 3 and 8 months (group I), 89 between 9 and 12 (group II), and 65 between 13 and 21 months of age (group III). Out of 796 bled prior to vaccination only four were positive and nine suspicious. No difference was noted in the rate at which these and other animals lost their titer following vaccination. All of the 796 animals vaccinated were positive in a dilution of at least 1:200 two weeks following vaccination with the exception of two which remained negative even after being repeatedly vaccinated. Vaccinated calves showing a blood titer of at least 1:200 were in direct association with negative susceptible animals and in no instance did the latter show any change in their negative status.

There was a direct relationship between the age of the animal at the time of vaccination and the length of time that a posi-

tive blood reaction was retained. As an example, nine months following vaccination, 91 per cent of group I, 50.5 per cent of group II, and 20 per cent of group III were negative to the agglutination test. At 18 months following vaccination, group I showed 1.4 per cent positive and 3.4 per cent suspicious; group II contained 6.7 per cent positive and 21.3 per cent suspicious, while group III had 20 per cent positive and 40 per cent suspicious.

Of the pregnancies recorded on animals vaccinated in this experiment, 172 have had one calf, 90 have had two, 48 have had three, 26 have had four, and 8 have had five calves each. Out of the total number of pregnancies, ten, or 1.5 per cent, terminated in abortions of which five appeared to be due to *Br. abortus* infection.

After an average period of about four years under the calfhood-vaccination plan, the total number of adult animals in the eleven experimental herds increased from 596 to 686. Three of the herds are now completely negative, having replaced their reactors with vaccinated animals of their own raising. Exclusive of young stock, there are now 334 vaccinated animals, or 48.9 per cent of the total number in these herds. This group of 334 animals exceeds the 216 reactors formerly in the herds at the beginning of the experiment, but since the owners retained their reactors until unprofitable, a residue of 55 old reactors still remains.

Quarter milk samples from 77 vaccinated animals have been examined for the presence of *Br. abortus* organisms. Of these, 23 showed a positive blood titer in a dilution of at least 1:100 and in five instances *Br. abortus* was isolated. Three of these five animals were vaccinated in 1934 with a commercial vaccine which was reported to contain virulent *Br. abortus* organisms and two were vaccinated with strain 19. All were in herds more or less heavily infected with Bang's disease. In no instance did the *Br. abortus* organisms isolated resemble strain 19 in their cultural characteristics or effect on guinea pigs.

## CONCLUSIONS

1) From the aforementioned work, there was no evidence to indicate that vaccinated calves spread infection to susceptible animals.

2) There was no indication when strain 19 was used under field conditions that the organism became established on the premises and gained in virulence by passage through susceptible animals.

3) At present a positive blood titer caused by vaccination or one due to active Bang's disease can not be differentiated. Therefore, vaccination between the ages of 4 and 8 months rather than a later age appears to give better results in the establishment of a Bang-negative herd. Animals vaccinated at such an early age more rapidly lose their titer and even in infected herds continue to remain negative to blood tests.

4) From the limited number of milk samples tested for the presence of *Brucella abortus* in this experiment, it would appear that vaccination of heifer calves with strain 19 vaccine does not result in the establishment of the organism in the udder during lactation.

## Patriotic Publicity

John Morrell & Company, pork and beef packers of Ottumwa, Iowa, seized the opportunity of drawing public attention to the importance of livestock production in view of "the chaos existing in the world at the present time." Below is the company's conception of the situation as told to the livestock breeders of the Middle West:

Dear Mr. Livestock Raiser:

The chaos existing in the world at the present time has brought about a situation in the livestock industry that is little less than catastrophic. Due to total war in certain geographical areas a disastrous shortage in the world supply of meats, fats and milk has resulted.

So far, the livestock industry in the United States has been spared the devastating effects

of war. The industry here is also quite fortunate in many other particulars. For example, bovine tuberculosis has been put into noteworthy retreat more so than in any other country of the world. As a result of past wise efforts the incidence of this disease exists nowhere to a greater extent than one-half of one per cent. Veterinary police in the United States have repeatedly eradicated outbreaks of foot and mouth disease. Few, if any, countries can make this boast. Texas fever in cattle is being gradually routed and hog cholera can be definitely prevented at will.

These are only some of the notable accomplishments of the veterinary profession in the United States for which the livestock industry owes much, very much.

Thrifty, healthy livestock, as well as meats and meat food products derived therefrom, command best market prices. The veterinary practitioner has, in the majority of cases, thoroughly demonstrated his services as a distinct asset to the livestock industry. His fee, therefore, may be justly regarded as a wisely invested insurance premium which, in most instances, brings profitable returns through averting costly epizootics, or by bringing about improvement in the quality of the livestock. For example, skin diseases are definite drawbacks in the fattening of hogs and most certainly disqualify the cuts therefrom from bringing top market prices. Veterinarians are usually quick to discern these conditions which are too frequently overlooked by herd attendants. Here veterinarians can render a valuable service.

Therefore, John Morrell & Co. unhesitatingly recommends to those raising livestock the adoption of the practice of consulting your veterinarian with regularity. IN THE NAME OF NATIONAL DEFENSE THE CONSERVATION OF OUR LIVESTOCK RESOURCES IS NOW IMPERATIVE.

(Signed) Yours for more and better livestock,  
JOHN MORRELL & COMPANY,  
T. HENRY FOSTER, President.

The veterinary profession is grateful for this patriotic effort toward the conservation of livestock in this troubled world, being aware that in the tremendous industrial activities of the present moment, the main source of the nation's supply of food can be overlooked. Since the JOURNAL has emphasized the importance of an uninterrupted animal production so much in recent months that the subject seemed hackneyed, it is gratifying that large interests in the provision field are of the same mind.



# Vaccination to Control Brucellosis in Cattle\*

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VACCINE consisting of suspensions of *Brucella abortus*, U. S. Bureau of Animal Industry strain 19, has been used extensively in this country for over six years and answers are now available to some of the questions which have been raised since it was first developed by the Bureau. Answers in this paper are intended primarily to put on record data accumulated at the California station, as well as to express the personal conclusions of the writers. Evaluation of data published by others is not attempted at this time, although it has seemed advisable to mention some results published by federal officials.

1. *What measurable protection is conferred by vaccination with strain 19?* The results of conjunctival exposure of vaccinated animals during the first and second gestation period published by Cotton, Buck and Smith<sup>1</sup> are sufficient to answer this question as far as animals maintained on an adequate diet under favorable conditions are concerned. At the California station the writers<sup>2</sup> also have shown that when vaccinated heifers under such conditions are given moderate conjunctival exposure the protection may be 100 per cent. On the other hand, when vaccinated animals are exposed to several billions of virulent organisms, some may develop brucellosis and abort. It is possible that a deficiency of vitamin A and other dietary essentials may be contributing factors in certain

cases of brucellosis among vaccinated cattle.

While experimental trials under controlled conditions should be conducted, it must also be recognized that the ultimate proof of practical protection following vaccination can be determined only by field trials on a large number of dairy and beef ranches. In conducting such field work from the California station, it has not yet been possible to arrange with cattle owners for an adequate number of unvaccinated controls of the same age as the vaccinated animals. Nevertheless, the uncontrolled field trials conducted in infected herds have resulted in a marked reduction in the incidence of brucellosis in the young vaccinated stock as compared with the older nonvaccinated animals.

The results of parturitions of nonvaccinated cows in herds free from brucellosis and in herds kept relatively free by frequent blood tests and removal of reactors have been compared with parturition results from vaccinated animals in infected herds. From table I it will be seen that the proportion of normal calves is approximately the same for the vaccinated animals in infected herds as for the nonvaccinated cows in brucellosis-free herds, i.e., 94.1 and 93.6 per cent, respectively, while the proportion of normal calves from nonvaccinated animals in infected herds is 86.1 per cent.

Whenever possible, samples of colostrum and postpartum uterine material from vaccinated animals have been subjected to the guinea pig test for *Br. abortus*. The bottom section of table II shows these results. Of the 409 parturitions investigated, eleven were stillbirths and one of these yielded *Brucella*. Samples were tested from 29 animals which aborted, and four of these (13.8%) contained *Br. abortus*. It is probable, therefore, that less than 15 per cent of the abortions and stillbirths in vaccinated animals were caused by brucellosis.

\*From the Division of Veterinary Science, University of California; presented before the first general session of the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940. This study was supported in part by grants from the U. S. Bureau of Animal Industry. Assistance in the preparation of these materials was furnished by the personnel of WPA Project O.P. No. 665-08-3-29.

<sup>1</sup>Cotton, W. E., Buck, J. M., and Smith, H. E.: Further studies of vaccination during calthood to prevent Bang's disease. J.A.V.M.A., lxxxv (1934), n. s. 38 (3), pp. 389-397.

<sup>2</sup>Haring, C. M., and Traum, J.: Observations of pathogenic and antigenic effects of *Brucella abortus*, United States Bureau of Animal Industry strain 19. J. Agr. Res., lv (1937), pp. 117-128.



TABLE I—Results of Parturitions During a Four-Year Period in Groups of Cows in Dairies Conducting Vaccination Programs

CONDITION OF HERDS WITH RESPECT TO BRUCELLOSIS	TYPE OF ANIMALS	RESULTS OF PARTURITIONS		
		TOTAL	PERCENTAGES	
			NORMAL CALVES	ABORTIONS, STILLBIRTHS AND PREMATURE
Free, or relatively free	Group A; not vaccinated	6,860	93.6	6.4
	Group B; vaccinated	2,872	94.1	5.9
	Group C; not vaccinated	1,763	86.1	13.9

In addition, 369 samples from vaccinated animals at times when they produced living normal calves showed virulent *Br. abortus* to be present at three (0.8%) of these normal parturitions. Two of these isolations represent one animal which shed the organisms in her milk when both her first and second normal calves were born. This heifer showed a steady rise in titer from the time of vaccination, suggesting that she might have become infected with virulent *Br. abortus* at about the same time she was vaccinated. The remaining isolation of the organism from a normal parturition appears to be a case in which the heifer tolerated the transient presence or localization of infection without showing clinical brucellosis. This opinion is based on the fact that in this animal no agglutinins were detected by frequent blood and milk serum tests, and subsequent guinea pig inoculations failed to show the organism again. This sort of tolerance to *Br. abortus* in a vaccinated heifer also has been observed in one of the exposure trials conducted by the writers, under controlled conditions, in which a heifer failed to develop agglutinins either before, at, or after the isolation of virulent *Brucella*, and repeated guinea pig inoculations thereafter gave negative results.

Another heifer, not mentioned above because her blood titer at vaccination is unknown, showed *Brucella* indistinguishable from strain 19 in the udder secretion and colostrum at three different times during her first pregnancy, which ended in hydrometra.

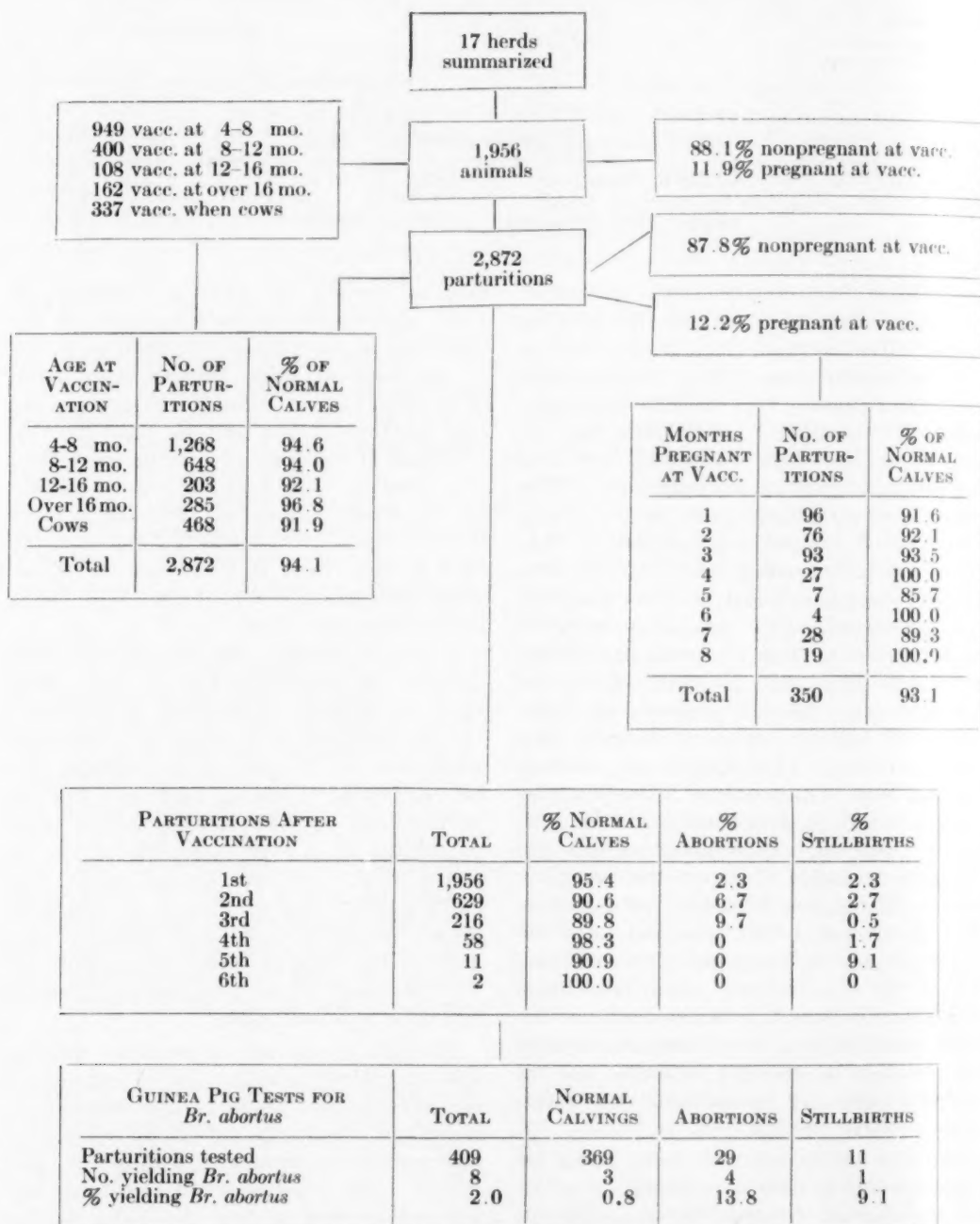
Table II summarizes the data now avail-

able on results of 2,872 parturitions of 1,956 animals which were negative to the blood test at the time of vaccination. About 17 per cent of these animals were adult cows when they were vaccinated, more than half of them being one to eight months pregnant at the time of vaccination. Most of the heifers were between 4 and 8 months of age when vaccinated, although a large number were over 8 months old, and 162 heifers were from 16 to 36 months of age when vaccinated, some of the latter being pregnant at that time.

Table II indicates that the age at which animals are vaccinated has no great effect upon the results of subsequent parturitions. Of 468 pregnancies of animals which were adult cows at the time of vaccination, 91.9 per cent ended in normal calvings. The 285 parturitions of 162 heifers which were vaccinated when over 16 months of age resulted in 96.8 per cent normal calves. The 2,872 parturitions of all age groups combined, including cows and pregnant animals at the time of vaccination, show that 94.1 per cent of the pregnancies produced full-term vigorous calves.

The use of vaccine on pregnant animals was considered advisable as an experiment in order to be able to furnish answers to questions repeatedly raised by veterinarians and cattle owners regarding this procedure. The practice is not free from danger, as at this station the usual vaccine dose given to a cow in advanced pregnancy was followed by abortion. Extensive placentitis was observed and *Br. abortus* indistinguishable from strain 19 was recovered from the uterine material.

TABLE II—Results of Parturitions Following Vaccination of Animals Which Were Negative at Time of Vaccination\*



\*Included in this table are data from animals vaccinated as calves, heifers, or adult cows, and pregnant and nonpregnant animals. Most of these animals are in heavily infected herds.

The data on heifers and cows which were pregnant at the time of vaccination are comparatively meager, and those vaccinated during the later months of gestation show varying results. The parturitions of all pregnant cows and heifers, regardless of the stage of pregnancy at the time of vaccination, averaged 93.1 per cent normal calves. Guinea pig tests were made on parturition samples from 28 of the animals which were pregnant when vaccinated, and the only isolation of *Brucella* was from a cow which was 8 years old and 40 days pregnant at the time of vaccination; this animal gave birth to a full-term dead calf.

The duration of the resistance which may be conferred by vaccination can not yet be reliably judged by the data available. However, the 1,956 animals shown in table II, which includes heifers and cows, pregnant and nonpregnant when vaccinated, showed for the first, second and third parturitions, respectively, 95.4 per cent, 90.6 per cent, and 89.8 per cent normal vigorous calves. Only 58 animals have completed their fourth pregnancy, 98.3 per cent resulting in normal calves.

The data on revaccination of heifers are not yet sufficient to be of value. However, as the above-mentioned results do not indicate any great disadvantages resulting from vaccination of cows and pregnant animals, it would seem desirable to consider the possible value of revaccination.

*II. Can the systematic vaccination of calves in infected herds ultimately result in the complete eradication of brucellosis?* In so-called problem herds where new cases of brucellosis continue to appear in spite of frequent tests and the prompt removal of reactors, a program of calfhood vaccination is especially to be recommended. When combined with a test-and-slaughter program, calfhood vaccination will materially hasten complete eradication. Under conditions where it is impractical to remove reacting animals as long as they continue to yield milk profitably, or are of outstanding genetic value, the vaccination of nonpregnant heifers regardless of age, followed by the systematic vaccination of calves, may even-

tually result in complete disappearance of the disease in a few years. Such a herd has been described by Haring<sup>3, 4</sup> in previous publications. In 1933, this herd contained 44 per cent infected cows, but by 1939 the disease had completely disappeared.

*III. What conditions favor best results from vaccination?* A desirable precaution is to test all heifers at the time of vaccination, and again between three and six weeks following vaccination. Under many conditions of practice this may not be possible, but when practical it will serve as a valuable indication of the antigenic potency of the vaccine and its probable immunizing effect, even though the height of the agglutination titer is not a reliable index of the degree of immunity conferred. Moreover, if a heifer fails to show an appreciable agglutination titer as a result of vaccination, it may be desirable to revaccinate. If a considerable number of animals fail to show titers of 1:200 or higher, the potency of the particular batch of vaccine should be questioned.

Theoretically the resistance of nonpregnant vaccinated heifers should be enhanced when they are exposed to aborting cows. On the other hand, it is desirable that pregnant heifers be removed from direct contact with aborting cows within three months after they are bred. Infection contracted by an animal during the middle third of pregnancy is more apt to induce severe clinical brucellosis than if contracted in early pregnancy. On most well-managed farms it is not customary to permit pregnant heifers to run with the milking herd, but such heifers also should be kept away from the dry cows which are usually in an advanced stage of gestation. Experiments at Berkeley have shown that the resistance conferred by vaccination may under certain conditions be overwhelmed in pregnant heifers by close exposure to cows aborting from brucellosis.

<sup>3</sup>Haring, C. M.: Vaccination against Bang's disease in an infected dairy herd with United States Bureau of Animal Industry *Brucella abortus* strain 19. J.A.V.M.A., xcii (1938), n. s. 45 (1), pp 52-60.

<sup>4</sup>*Ibid*: Results from calfhood vaccination. Holstein-Friesian World, xxxvii (1940), pp. 211-212, 224.

TABLE III—Relation of Age at Vaccination to the Percentage of Heifers Whose Titers Have Receded to Less Than 1:25 (Negative), at Various Intervals After Vaccination

AGE AT VACCINATION	NO. OF ANIMALS VACCINATED	PERCENTAGE TESTED WHICH SHOWED TITERS LESS THAN 1:25 AT MONTHS AFTER VACCINATION AS INDICATED						NO. OF ANIMALS AT FINAL TEST
		4	6	12	24	36	48	
4 to 8 mo.	283	28	54	81	99	99	99	241
8 to 12 mo.	261	12	22	48	91			155
12 to 16 mo.	113	9	13	33	83	98		54
Over 16 mo.	221	1	1	2	50	73	91	21

IV. *How long after vaccination will animals remain reactors to the agglutination test?* This depends on at least three factors: (1) the age of the animal at the time it is vaccinated, (2) whether or not it is exposed to virulent *Brucella* organisms, and (3) the relative proportion of R and S type organisms in the particular vaccine used. In table III is shown, for different age groups at vaccination, the percentage of the total number of animals whose titers had receded again to negative (less than 1:25) at various time intervals after vaccination. This clearly shows that the older heifers maintain positive or suspicious titers longer than do younger heifers and calves, and also that a few animals will fail to become negative again for four or more years after vaccination. It may be anticipated that over 95 per cent of calves vaccinated before 8 months of age will be negative before their first calving, and only a very occasional one will still have a titer over 1:50 at that time. It is frequently observed, especially in infected environments, that after an animal's titer has receded to 1:50 or below, it may fluctuate from zero to 1:50 for two or more years. The vaccine does not always prevent a second rise in agglutination titer following contact with virulent *Br. abortus*, although there is evidence that the increase in agglutinins in the vaccinated animals is less in degree and persistence than in nonvaccinated control animals associating with aborting cows.

Persistence of agglutinins in vaccinated animals until after breeding age has not been considered at the California station

to be sufficient reason for their removal from the herd. Owners have been advised to breed such animals regardless of their agglutination titers, and the results thus far have been highly satisfactory.

The development and persistence of agglutinins resulting from vaccination is attributable to the smooth (S) type organisms in the vaccine. The rough (R) type is antigenically inert.

V. *Is it ever desirable to use vaccine in herds that are free from brucellosis?* In order to answer this question, observations were made at the University on vaccinated cattle associated with nonvaccinated cattle of various ages and conditions of pregnancy. Service to both groups was provided by the same bulls. No transmission of infection has yet been observed, although such groups ranging from 20 to 40 animals have been under close observation and frequent test for over seven years. During the past two years calfhoo-d-vaccination programs have been undertaken in a few brucellosis-free herds where the owners feared infection from neighboring herds or other sources. So far there have been no ill effects observed from vaccinating heifers between the ages of 6 and 10 months in noninfected herds.

VI. *What justification is there for vaccinating adult cattle?* Objections to the vaccination of adult cattle have been made in reports of the Committee on Bang's Disease of the American Veterinary Medical Association.<sup>5</sup> However, under the conditions

<sup>5</sup>Report of the Committee on Bang's Disease. J. A.V.M.A., xciv (1939), pp. 606-609.



existing at present in California, where the test-and-slaughter method is not being generally followed, there seems to be no good reason for a veterinarian to refuse to vaccinate nonpregnant cows in badly infected herds.

In August 1939, at Memphis, the writers called this subject to the attention of the AVMA Committee on Bang's Disease, with a statement essentially as follows:

We do not wish to challenge the wisdom of your committee in its unreserved condemnation of adult cattle vaccination under the conditions that now exist in many of the eastern states. In certain experimental herds in California, however, beneficial results have been obtained by the use of strain 19 on adult cattle. For instance, when vaccinations were begun in 1933 in the San Quentin Prison dairy herd, strain 19 was used on 17 unbred heifers between 12 and 32 months of age. This herd, although badly infected at the time, is now apparently free from *Brucella* infection. If the vaccinations had been limited to the calves between 4 and 8 months of age, a relatively large group of highly susceptible older heifers would have been left unvaccinated. It seems obvious that failure to vaccinate the older heifers would have delayed the eradication. Under the circumstances it might even have resulted in complete failure of the project. The labels on government-licensed vaccine made from culture 19 contain the following wording: "Recommended only for the immunization of calves from 4 to 8 months old inclusive." In spite of this warning thousands of older cattle have been vaccinated by veterinary practitioners. Strain 19 has been used at the California station on adult cattle in experimental herds only, and has not been officially recommended for use on older animals. Would it not, perhaps, be advisable to change the wording of the label by at least omitting the word "only," so as to read, "Recommended for use on calves between the ages of 4 and 8 months?" This would give the veterinarian an opportunity to use the vaccine on older cattle when in his best judgment such procedure would be most desirable, without flagrantly violating specific instructions.

Cows which were already reactors to the agglutination test have been vaccinated by many veterinarians because they or the owners believed there was nothing to lose and possibly some benefit to be gained. The records of many such vaccinations have been studied, and the writers have given vaccine to a small scattered number of reacting

cattle. Results do not permit definite conclusions, except that there is apparently no good reason for vaccinating positive cattle, either on theoretical grounds or from the actual results obtained.

*VII. Is vaccination still in the experimental stage?* In the opinion of the writers, the chief reason for insisting that vaccination against brucellosis is still an experiment is the great variability in the antigenic and pathogenic characters of *Br. abortus* cultures when cultivated for a long time *in vitro*. The work of Henry<sup>6</sup> at the California station, and of others, on dissociation in the genus *Brucella*, clearly demonstrated the existence of this phenomenon in many strains of *Brucella*. Strain 19 is no exception. Vaccine made from this strain which is now in use by the government and various commercial laboratories contains several variants. The organism as first isolated from diseased animals is nearly always entirely in smooth (S) type colonies. Huddleson<sup>7</sup> has apparently demonstrated the presence of the capsule in the S and its absence in the R type. The vaccines now in use fluctuate in the proportion of smooth (S), intermediate (I), and rough (R) types. Such fluctuations are accompanied by differences in antigenic and pathogenic power of the vaccine suspensions. Knowledge is now increasing by which the proportion of R and S, as well as other types, may be subject to artificial control. As yet, however, the proportion of the respective variants which will produce the best vaccine is not known. Unexpected and unexplained results in controlled and field vaccination trials may in part be due to the effect of these variants.

Workers at this station have shown that transfer of strain 19 every two days will result in changing a pure S culture into a pure R culture in about a week. This change may be ascribed to the fact that the R type grows more rapidly. It has been the experience of the writers and others that cultures in which the R type

<sup>6</sup>Henry, B. S.: Dissociation in the genus *Brucella*. *J. Inf. Dis.*, lli (1933), pp. 374-402.

<sup>7</sup>Huddleson, I. F.: The presence of a capsule on *Brucella* cells. *J.A.V.M.A.*, xevi (1940), p. 708.

predominates may be freed from that variant by passage through guinea pigs, goats or cattle. As yet it is not known if such pure S cultures are perfectly safe to use as vaccine. According to Henry,<sup>6</sup> the transplantation of S type colonies picked from plates does not alter the tendency of a given strain to dissociate rapidly under conditions favorable to such dissociation.

#### SUMMARY

Vaccination with strain 19 has given a high degree of protection as indicated by controlled infection experiments and by a 94.1 percentage of full-term calves in vaccinated animals in field trials among infected herds. This figure is slightly higher than the percentage in herds free from brucellosis or kept relatively free by frequent blood tests and removal of reactors. In a herd having 44 per cent infection the disease completely disappeared following a six-year program of heifer and calfhood vaccination during which the diseased cows were permitted to remain in the herd until economically useless.

Tests for agglutinins in the blood serum are desirable not only at the time of vaccination to determine if the animal is infected, but also between three and six weeks following vaccination in order to measure the antigenic potency of the vaccine.

Association of nonpregnant vaccinated heifers with infected and aborting cows may increase the resistance conferred by the vaccine, but such association after the third month of pregnancy has been known to overwhelm the resistance conferred by the vaccine and to induce clinical brucellosis.

The length of time agglutinins will persist after vaccination depends on at least three factors: (1) the age at vaccination, (2) whether or not the animal is subsequently exposed to virulent *Brucella* organisms, and (3) the relative proportion of rough (R) and smooth (S) types of organisms in the vaccine used. It may be anticipated that over 95 per cent of calves

vaccinated before 8 months of age will be negative before their first calving.

It was found desirable to use strain 19 for calfhood vaccination in certain herds free from brucellosis when there was danger of the introduction of infection.

In infected herds the vaccination of non-reacting adult cows may be justified under certain conditions, but no evidence has been revealed to indicate that the vaccination of reacting cows is of value.

Vaccines now in use differ in the proportion of smooth (S), intermediate (I) and rough (R) type organisms. Such differences are accompanied by fluctuations in antigenic and pathogenic power of the vaccine suspensions. Progress is being made in methods to control dissociation and otherwise to improve and standardize the manufacture and use of the vaccine. Until these improvements come into general use, even if there were no other reasons, the writers consider vaccination with strain 19 to be still in the experimental stage.

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The antidote for vomiting following the oral use of sulfapyridine is nicotinic acid, says an article in current medical literature.

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Butterfat production is improved when cows are milked by a timing device that rings at the end of four- or five-minute periods, experiments in New York State show.—*Science News Letter*.

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No article on a veterinary subject was ever as widely reprinted in lay publications as the one on calfhood vaccination by Mohler, Wight and O'Rear, published in the January issue of the JOURNAL.

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Donkeys, cats and parrots in London announce the coming of air raids ahead of the siren, says a writer in *Our Dumb Animals*, and he cites several instances to prove it. To those who understand the finesse of the special senses of animals, the report is not fictitious.

# Syndrome of Temporary Alveolar Pulmonary Emphysema (Heaves) in the Horse Following Intravenous Injection of Histamine\*

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DURING anaphylactic reactions in the guinea pig and dog the histamine concentration of the blood is increased (Dragstedt and Gebauer-Fuelnegg,<sup>1</sup> Code<sup>2</sup>). In the horse, on the contrary, it has been found that the histamine content of the blood is not increased during acute anaphylaxis (Code and Hester<sup>3</sup>). This finding prompted us to study the action of histamine and the rate of disappearance of histamine from the blood stream in the horse. This report deals with the clinical symptoms following the intravenous injection of histamine and those occurring during certain foreign-protein reactions in horses. The clear-cut clinical manifestations of histamine administration gave definite indications of the site of its action in the animal. Some of the symptoms closely resembled those often associated with certain pathologic states in the horse.

## EXPERIMENTAL PROCEDURE

The animals studied were a year-old male and two mares about 18 to 20 years of age, all apparently in good health. Histamine, in a dose of 40 mg. of the base in 25 cc. of physiological saline solution, was injected into the jugular vein. The injection time varied from six seconds to four minutes. At least one week was allowed to elapse before injections of histamine were repeated.

## RESULTS

The usual course of the symptoms in

eleven experiments on the three horses may be summarized as follows:

Interval Following the Injection of Histamine	Symptoms Noted
15 seconds	Uneasiness, curling of the upper lip, dilation of the nostrils
45 seconds	Salivation, protrusion of the anus on expiration, defecation, tenesmus
1 minute	Dyspnea marked by deep and accelerated respiration of the abdominal type with double pumping movement and marked abdominal furrow—so-called heave line
2 minutes	Profuse salivation, lacrymation, excessive perspiration around the anus and mammary glands, and a yellow mucoid nasal secretion
5 minutes	Drops of sweat rolling from the entire body surface
10 minutes	Cessation of excessive lacrymation
20 minutes	Cessation of excessive salivation
30 minutes	Cessation of obvious perspiration and a return towards normal breathing

The body temperature remained the same or increased only slightly during the reaction. The pulse rate increased to as high as 150 beats per minute, and when the rate was rapid the pulse felt soft and at times was hardly perceptible. There seems little doubt but that the blood pressure was reduced during the height of the reaction. The respiration rate increased in some cases to 48 per minute. Extension of the injection over a four-minute period appeared to produce a more pronounced reaction, probably due to the prolonged supply of histamine to the tissues. In all experiments the symptoms had subsided about an hour after the injection, when the horses

\*Paper No. 1870, scientific journal series, Minnesota Agricultural Experiment Station; contribution from the Division of Veterinary Medicine and the Department of Physiology, University of Minnesota. This investigation was aided by a grant from the Committee on Scientific Research of the American Medical Association.

<sup>1</sup>Dragstedt, C. A., and Gebauer-Fuelnegg, E.: Amer. J. Physiol., cii (1932), pp. 512, 520.

<sup>2</sup>Code, C. F.: Amer. J. Physiol., cxxvii (1939), p. 78.

<sup>3</sup>Code, C. F., and Hester, H. E.: Amer. J. Physiol., cxxvii (1939), p. 71.



were seemingly normal except for a slight increase in pulse and respiration rate.

The prominent features of the reaction may be grouped under three headings—increased secretion, difficult breathing and increased peristalsis. The increase in the activity of the glands whose secretions appear at the surface of the body was extremely marked. Within the first minute saliva dripped from the mouth, and a minute or two later tears rolled from the eyes, mucus appeared at the nostrils, and profuse sweating occurred over the body. The animals showed the effects of a powerful secretagogue action of histamine. It should be pointed out, however, that the increased sweating was, quite possibly, not due to the direct action of histamine. Injection of adrenalin causes sweating in horses. It may be that the sweating following the histamine injection was due to adrenalin liberated as a result of a lowered blood pressure produced by the histamine.

Dyspnea was one of the most pronounced features of the histamine action. The animals showed the same distention of the chest, despite apparent maximal expiratory effort, as that generally seen in heaves in horses, anaphylaxis in guinea pigs and acute asthma in humans. Throughout the respiratory difficulty blood taken from the jugular vein was extremely dark. It seems probable that the respiratory symptoms were due to a sudden intense contraction of the smooth muscle of the bronchioles.

Another indication of contraction of smooth muscle was the effect noted on the intestinal tract. Uneasiness, pawing and turning the head to the flank suggested intense contraction of the intestine. Greatly increased peristalsis was evidenced by the rapid and explosive emptying of the bowel. Early in each experiment the feces first expelled were solid and well formed. Later the watery, semisolid nature of the fecal material indicated a possible increase in intestinal secretions associated with the active peristalsis. Fasting overnight previous to the experiment appeared to increase the intensity of the intestinal disturbance.

The consistent absence of urination following the histamine injection was a surprising observation, for intense muscular

contractions around the vulva and clitoris occurred early in every experiment.

Towards the end of the histamine experiments the two aged mares were sensitized to egg white.

#### PROCEDURE AND RESULTS OF EGG-WHITE SENSITIZATION

The egg white was prepared by diluting one part of fresh egg white with four parts of physiological saline solution and mixing until the gelatinous character of the egg white disappeared. The first mare received 750 cc. over a fifteen-day period. Fifty cc. was injected subcutaneously and intravenously on alternate days. After a five-week rest period 500 cc. of egg white in one dose was introduced intravenously with no apparent effect on the mare. About two weeks later a second 500-cc. dose was again injected intravenously. The injection was completed in about a minute.

The symptoms manifested were uneasiness, dilation of the nostrils, dyspnea, defecation and weaving. The pulse and respiration rate decreased. A paralysis of the hind limbs resulted within three minutes, and the patient fell to the floor. At the end of 50 minutes she was still unable to arise. Epinephrine chloride was administered intravenously. Following this procedure convulsive movements of the limbs, ears, nostrils and eyes appeared, which lasted for several minutes. In about ten minutes she was able to rise to her feet and appeared normal. Three days later she became ill and was destroyed. The postmortem findings were negative.

The second mare was sensitized to egg white in a different manner. Five hundred cc. was injected intravenously for the first dose. For the succeeding ten days she received 50 cc. subcutaneously and intravenously on alternate days, which gave a total of 1,000 cc. After the three-week rest period she was given a rapid injection of about 300 cc. of egg white intravenously.

The symptoms noted were uneasiness, curling of the upper lip, sudden violent dyspnea which lasted for several minutes, during which the mare went down. While recumbent she passed urine. Recovery



was rapid, and upon getting up she passed feces. In this case no lacrymation, salivation or perspiration was noted.

#### COMMENT

The first horse sensitized to egg white did not show as characteristic a picture of acute anaphylaxis as was seen in the second horse. Both animals suffered the labored breathing which was such a prominent feature of the anaphylactic reactions observed by Code and Hester.<sup>3</sup> Sweating, however, was absent in the anaphylactic reactions in this study, whereas it was very evident in the animals observed by Code and Hester. It seems possible that the extreme age of the animals used in this study and the previous histamine injections may have modified the reactions.

The horse injected with histamine shows the same prominent symptoms as the horse in anaphylactic shock, and both animals show respiratory difficulty indistinguishable from that seen in heaves. However, neither the histamine nor the foreign-protein reaction caused coughing, which is characteristic of heaves in the horse. The most likely common factor producing the labored breathing seems to be contraction of the bronchiolar musculature. Sweating often occurs in acute anaphylaxis in the horse, and it seems a constant feature of the sudden reaction to histamine in this species. Rapid evacuation of the bowels is also common to both conditions. Yet, there are certain differences in the two types of reactions and it is difficult to appraise their importance when considering the fundamental cause of the reactions.

In our experiments histamine injection regularly failed to produce urination, yet this is a frequent occurrence in foreign-protein reactions. Similarly, lacrymation did not take place during the anaphylactic reaction observed in this study or during those seen by Code and Hester, while it was a universal accompaniment of histamine injection.

Aberblom and Sjöberg<sup>4</sup> followed the effects of slow infusion of histamine by vein

in horses. The largest dose they administered was 33.7 cg. of the dihydrochloride of histamine given in the course of 4¾ hours. They did not report the acute symptoms of histamine action, and it seems probable that, as a result of their slow-injection technic, the acute phases of the reaction did not occur.

#### CONCLUSION

Histamine injection into the blood stream of horses induced respiratory symptoms indistinguishable from those associated with acute anaphylactic shock and, with the exception of coughing, characteristic of acute alveolar emphysema (heaves).

### Feeding Garbage to Hogs

At best, the feeding of garbage to hogs is not elegant. Compared with the feeding of milk cows, sheep and beef cattle on green pastures and shady nooks, garbage-feeding plants do not reflect the savor that makes milk and meat popular components of the human ration.

Wherever seen, the practice offends the eye and could not be opened to the gaze of the public without damage to the swine-breeding industry. Sight is quite as important as taste in the selling of food. No one could sell pork to consumers at the gate of a garbage-feeding plant nor for long hide the scene behind closed doors. On the long run, therefore, garbage feeding can not be regarded as an economical practice for the nation unless reforms seemingly impractical are instituted. Garbage feeding saves some towns the expense of garbage disposal in other ways, and it probably makes money for the feeders, but on the whole the economics of the practice is dubious. The incidence of trichinosis in garbage-fed hogs is probably less important than the inelegance of the enterprise.

Comes a rumor that the Farm Bureau Federation wants the local farm bureaus to take full charge of the distribution of the federal funds allocated to farmers under the AAA. When and if this comes to pass, the county agent and his farmer organization will be a power indeed.

<sup>4</sup>Aberblom, E., and Sjöberg, K.: *Arch. f. Exp. Path. & Phar.*, cxxxix (1938), p. 33.

## Canine Nutritional Deficiency Diseases\*

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THE ECONOMIC importance of the dog today surpasses the status of this animal at any time in the history of mankind. There has been a steady rise in the popularity of dogs since the World War, with a reported 1,800,000 dogs registered with the American Kennel Club and similar dog-fancy organizations. This, of course, does not take into account the estimated 15 million crossbred and pedigreed dogs in the United States and Canada. One fourth, or 3,750,000, of them are the pedigreed and purebred but not registered class of dogs. Leon F. Whitney, D.V.M., in an article published recently in the *American Kennel Gazette*, stated that the farm-dog population is at least 7 million. In his estimation of the economic importance of dogs, as regards their food consumption, he stated that it requires 37,305,000 acres of land to produce their food. This area is equivalent to the acreage of the entire New England States, plus Pennsylvania, New Jersey, Delaware and Maryland. Whether or not this estimate is correct, we are not in a position to say, but we do know that with the increase in the dog population the demand for prepared foods has shown a decided increase.

According to investigators, a great many dogs require treatment for ills which are primarily of dietetic origin. There may be several reasons for such an opinion, prominent among them being:

- 1) Increased care and attention being given the dog by the average owner.
- 2) The greatest percentage increase in dog ownership has occurred in metropolitan districts where the animal leads a restricted life, both from a standpoint of exercise and diet.
- 3) A majority of the brands of canned dog foods claim to have a completely balanced diet, a statement which is open to doubt in a large number of cases. Dogs

fed exclusively on an inferior product are almost certain to become ill with many symptoms of deficiency.

As to the volume of prepared dog foods, we can state that the sale of canned and dried dog foods has either followed or led this increased desire for dogs in the home. There are at present approximately 600 brands of dog food offered for retail sale, prepared by over 250 manufacturers. The 1939 total volume was, in round figures, 600 million lb. The volume of the canned product was second only to milk, which ranks first.

We are well aware that there are on the market a number of canned dog foods, as well as dry ones, which are the result of honest, scientific efforts to make a nutritionally adequate and wholesome product. Unfortunately, we also know some brands are being marketed that are of inferior nutritive quality. The dog and its nutritive requirements, the expectancy of the owner to obtain full value for his money, and the hope of the veterinarian that he can recommend a dog food to his clients with confidence, are all points which should be given due consideration by manufacturers. It would seem of paramount importance, therefore, that some accurate, fast and economical method be devised to appraise the nutritive value of all dog foods.

### DIETARY REQUIREMENTS

Most of the information available on the dietary requirements of the dog has been compiled from a large number of experiments in which the dog was merely a test animal. Unfortunately, there have been relatively few studies made on the requirements of the dog itself. Prominent among the investigators who have used the dog as an experimental animal and from whose work we may draw conclusions are Ivy of the Northwestern University Medical School; Cowgill of Yale; Steenbock and

\*From the research laboratory of Swift & Company.

associates of Wisconsin; Elvehjem and co-workers of Wisconsin; Mellanby of England; and Schlotthauer of The Mayo Foundation, to mention only a few. Discussing the various nutrients individually we mention the following:

1) *Protein*.—The nutritive value of any protein material is dependent directly upon the amino acids it can supply. There are ten or more essential amino acids which must be present in the dog's diet to permit proper growth (muscular, glandular, general tissue, and hormone formation; and replacement). In general, the proteins of animal origin are far superior to those found in cereals or vegetables. Mixtures of proteins from vegetable and cereal sources are appreciably improved by the addition of meat proteins. In general, one may say that dog foods containing 10 per cent of protein, which is primarily of animal origin (usually not less than 75 per cent of animal origin), will give excellent growth, provided the other essential nutrients are present. It has been found by biological experimentation that those dog foods containing less than 10 per cent of protein are liable to be deficient.

From the above statement on the place of proteins in the diet, we feel that it would be presumptuous to point out the deficiencies that can arise from the use of a diet which is low in proteins of high biological value. We deem it appropriate, however, to call attention to the work of Agnes Fay Morgan of California and Elvehjem and coworkers of Wisconsin, who have held that fright disease was due to a deficiency of one of the essential amino acids, lysine. Elvehjem *et al* reported before the American Chemical Society meeting at Detroit, in September 1940, that on tests they had run on baked dry dog foods nervous and paralytic symptoms of the test animals had developed as well as an unsatisfactory growth. This they attributed primarily to a deficiency of lysine, which is not heat-stable in dough mixtures.

2) *Fat and Carbohydrates*.—That dogs are able to almost completely digest starch has been demonstrated by Ivy of the Northwestern University Medical School. The

main objection to canine rations high in carbohydrates is that this substance displaces proteins, minerals and vitamins and thus acts to decrease the percentage of these factors in the diet. It is probably safe to say that a nutritive ratio of two parts of carbohydrates and fat to one part of protein should be the maximum limit in a dog's ration. The requirement or tolerance for fat will depend a great deal, of course, upon the energy requirement of the individual animal. It has been suggested that a range of a maximum of 5 per cent and a minimum of 2 per cent fat in a canned dog food is probably best suited for all types of dogs. The nutritive value of proteins, carbohydrates and fat is not appreciably impaired by canning processes.

3) *Energy Requirements*.—The deficiencies due to an inadequacy of carbohydrates and fat are readily apparent from the following discussion of their function and requirements. During the periods of puppy growth, pregnancy and lactation, dogs require more than the maintenance allowance of food. It has been indicated that puppies may require about twice the predicated maintenance levels on caloric intake for adult animals. The accepted standard on caloric requirements for a dog from a maintenance standpoint, as determined by Cowgill, has been 70 to 80 calories per kilogram of body weight per day. This means approximately 30 to 40 calories per pound per day, varying widely according to the stage of development, weight and working conditions.

If a dog food meets the minimum standard of 10 per cent protein, 2 per cent fat and a nutritive ratio not greater than 2 to 1, the range of canned food intake per dog per day will be about from 1 lb. for a 15-lb. dog to 2½ lb. for a 50-lb. dog, with increased food intakes for unusual functions. It must be remembered that the most satisfactory way of supplying elements for the maintenance of body heat and supplying energy is by the supplying of an adequate amount of carbohydrate and fat, and not by the wasteful and excessive use of proteins.

4) *Minerals*.—The requirements of dogs



Fig. 1. Avitaminosis A. Advanced stage of ophthalmia in a dog kept on a vitamin A-deficient diet for 84 days. Almost complete collapse made it necessary to support the head for this picture.

(Photo courtesy American Journal of Physiology.)



for the mineral elements have not been sufficiently studied to permit accurate estimations. Some idea of the requirements may be obtained, of course, from general figures for other animals' requirements. Calcium and phosphorus, which are so essential both in amount and in balance to the formation of strong bones and sound teeth, are completely available to the dog when supplied as bone ash or ground bone. Most rickets in the dog has been found to be of the type caused by a combination of vitamin- and mineral-deficiency factors. This constitutes another argument for a relatively high meat content in dog foods, since these products are rich sources of essential minerals and vitamins. This does not, however, mean that mineral supplementation as well as vitamin supplementation to most dog diets is not necessary. Other essential minerals, such as iron, copper, iodine, magnesium and sulfur, are ordinarily considered to be furnished in adequate amounts by the natural plant and animal products which are used in the better classes of prepared dog foods and home-prepared diets. Common salt will, of course, supply the necessary sodium and chlorine. Additional information relative to mineral and deficiency diseases will be

given in a later paragraph in this paper in the discussion of vitamin D.

5) *Vitamins*.—The vitamin requirements of the dog have been studied in detail by Cowgill of Yale, who used this animal in his original work on vitamin B<sub>1</sub>. Other investigators have used the dog for studies on vitamin D in relation to the deficiency disease, rickets, and vitamin A in relation to muscular weakness and the eye deficiency disease of xerophthalmia. The vitamin C requirement of the dog has been closely studied and it has been found that this animal is able to synthesize the vitamin.

It might be well to state here that the question of vitamins is not related to the individual vitamin materials but, rather, to the function of all of these materials in proper balance and combination. A deficiency of one vitamin may cause an improper metabolic use of all the other vitamins which are known to be essential. Such a statement is, of course, true of any balanced diet. There are always certain limits above the minimum requirements which will not upset the balance of a ration, but should any one of the essential nutrients, including minerals and vitamins, be out of balance from the standpoint of deficiency, there will be a corresponding



unfavorable reaction from all the other food materials.

Tremendous strides are being made daily in the isolation and identification of the many vitamins concerned in human and animal nutrition. One of the most important recent findings is the identification of the canine anti-blacktongue and human anti-pellagra vitamin. This has been found to be a relatively simple chemical compound—nicotinic acid. The discovery was made by Elvehjem and coworkers of the University of Wisconsin. Sebrell of the U. S. Public Health Service, Cowgill of Yale and several others have verified the findings that nicotinic acid is the specific material concerned in the prevention and cure of canine blacktongue.

Concerning all nutritional research to the present time, we may outline the known vitamins and their functions in canine metabolism together with a description of them, including their deficiency symptoms, and other pertinent information as follows:

#### VITAMIN A

Generally recognized chemical formula  $C_{20}H_{30}O$ . Commonly designated as the anti-xerophthalmic vitamin. No chemical name has yet been officially adopted.

*Description.*—Soluble in oils, not in water, not affected by heat in cooking or drying, but

inactivated by oxygen at higher temperatures.

*Functions.*—Promotes growth, appetite and digestion. Essential for normal reproduction, lactation and rearing of the young. Protects against xerophthalmia, night blindness and against infections of the respiratory tract. Estimated requirement for dogs: 70 to 80 international units per kilogram of body weight per day.

*Deficiency Symptoms.*—A) Incipient stage. Lowered resistance to infections, inflammation of intestines and slight inflammation of the upper respiratory passages. Retarded growth or weight loss.

B) Advanced stage. Impaired vision, particularly night blindness. Inflammation of the conjunctiva even advancing to ulceration of the cornea. Injury to mucous linings of the body.

*Sources.*—Fish liver oils, liver, green vegetables, kidneys, butter, hearts, tomatoes, carrots, cheese, eggs, and milk.

#### VITAMIN B<sub>1</sub>

Generally recognized chemical formula  $C_{12}H_{17}N_4OSCl_2$ . Usually termed the anti-neuritic vitamin. Chemical name in the pure state, thiamin chloride.

*Description.*—Soluble in water and not in oils. Partially destroyed by heat, particularly in the presence of alkali and oxygen. It is available synthetically.

*Functions.*—Promotes growth, appetite, carbohydrate utilization and digestion. Protects against the nerve disease, polyneuritis. Required for normal reproduction and lactation.



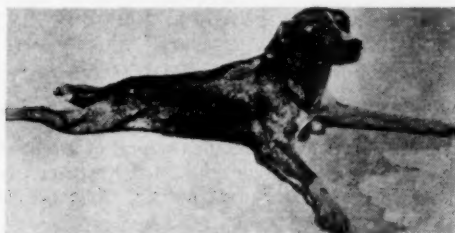
Fig. 2. Same subject as in figure 1 after having been treated for ten days with 20 cc. of cod liver oil per day. Note almost complete disappearance of the ophthalmia.

(Photo courtesy American Journal of Physiology.)

Estimated canine requirement 3 to 4 international units per pound of body weight per day for mature dogs, and up to three times this amount for the period of rapid growth.

**Deficiency Symptoms.**—A) Incipient stage. Poor growth of young during lactation, decreased fertility, inappetence and retarded growth or loss of weight.

B) Advanced stage. Polyneuritis characterized by paralysis and nerve degeneration, cardiac weakness and edema. Patton has reported



—Photo courtesy American Journal of Physiology.

**Fig. 3.** Vitamin B<sub>1</sub> deficiency, showing extensive polyneuritis. The leg muscles were contracted, especially those of the posterior extremities resulting in extension of all limbs and inability to stand. When this dog was handled, severe clonic spasms resulted.

that fright disease of dogs is due to a deficiency of this vitamin. This report is questioned by several investigators because they have not been able to reproduce his findings as reported.

**Sources.**—In the pure state as thiamin chloride. Also from rice polish, dried yeast, liver, lean pork, wheat germ, milk, beef, eggs, carrots, tomatoes, whole wheat and citrus juices.

#### RIBOFLAVIN

The generally recognized chemical formula is  $C_{17}H_{20}N_4O_6$ .

**Description.**—Soluble in oils, stable to heat.

**Functions.**—Essential for growth and in maintaining a healthy condition of the skin. Estimated canine quantitative requirement 25 micrograms per kilogram of body weight per day.

**Deficiency Symptoms.**—A) Incipient stage. Inconstant dermatitis consisting of erythema followed by dry, flaky exfoliation. In males the scrotum has been involved, otherwise most common on the chest, abdomen, insides of the thighs and axillae.

B) Advanced stage. Bradycardia and an exaggerated sinus type of cardiac arrhythmia. Premature aging. In the final stages, the respiration is slow and irregular, finally terminating in collapse, coma and death. Necropsy

findings center around a yellow mottling of the liver with a high fat content.

**Sources.**—Concentrates from liver, yeast and whey. Also from kidneys, liver, milk, lean beef, eggs, greens, soya flour, various fruits and vegetables.

#### NICOTINIC ACID

The usual quoted chemical formula is  $C_6H_5NO_2$ . The accepted descriptive name is anti-blacktongue or anti-pellagra vitamin.

**Description.**—Soluble in water, stable to heat.

**Functions.**—Necessary for the prevention or cure of canine blacktongue. Estimated dog requirement as protective for blacktongue 0.2 mg. per kilogram of body weight per day and curative 0.5 mg. per kilogram of body weight per day. Administered either orally or intramuscularly. Nicotinic acid amide is reported to have the same effect.

**Deficiency Symptoms.**—A) Incipient stage. Poor appetite, progressive weight loss.

B) Advanced stage. Vermillion bands on lips, general reddening of the oral mucosa and occasionally persistent diarrhea. This is particularly true in the marked deficiencies as well as the well-known extensive lesions of all oral tissue accompanied by a characteristic fetid odor.

**Sources.**—In the pure state as nicotinic acid. Also from liver, yeast, meat, wheat germ, tomatoes, beans, eggs, milk and soya flour.

#### VITAMIN B<sub>6</sub>

This has been termed by some investigators as pyridoxine. It is one of the newest members of the B complex, and was isolated in 1938 and



—Photo courtesy American Journal of Physiology.

**Fig. 4.** Same subject as in figure 3, 18 hours after the administration of neutralized tomato juice. Spasticity of the muscles and spasmodic condition almost gone.

synthesized for the first time in 1939 by Folkers and Harris of the Merck research laboratory.

Unna, in his paper prepared for the AVMA meeting in Memphis, 1939, stated: "Vitamin B<sub>6</sub>

is needed by rats and dogs for normal growth and development and there is a strong indication that it is also required by the pig and man. White rats on a diet complete in vitamin B<sub>1</sub>, nicotinic acid and riboflavin (and other factors recognized as the B complex) but deficient in B<sub>6</sub>, cease to gain weight after three to

ical formula is C<sub>27</sub>H<sub>45</sub>O. No chemical name has been adopted, officially, nor has this vitamin yet been synthesized. Quite a few workers prefer to split this vitamin up into several divisions, giving them numbers as vitamin D<sub>2</sub>, D<sub>3</sub>, etc.

**Description.**—Soluble in oil; stable to heat and oxidation. Occurs in several forms.

**Functions.**—Regulates the absorption and metabolism of calcium and phosphorus for the bones and teeth. Prevents rickets. Canine requirement is the subject of considerable controversy. It has quite generally been stated that 1.5 to 2 international units per kilogram of body weight per day for mature dogs and 20 to 25 international units per kilogram of body weight per day for the period of rapid growth was adequate, but a great deal of research tends to cast suspicion on these figures. The smaller dogs, particularly terriers of all kinds and some of the spaniels, may require



—Photo courtesy American Journal of Physiology.

**Fig. 5.** Vitamin D deficiency. This dog grew from puppyhood on a vitamin D-deficient diet which resulted in this extreme case of rickets.

six weeks and develop characteristic skin lesions of so-called rat acrodynia. The paws become swollen, edematous and denuded. Ulcers frequently develop around the snout and on the tongue. The ears thicken and become scaly. The animals lose weight and die within one to three weeks after symptoms develop. Administration of vitamin B<sub>6</sub> relieves the symptoms promptly and the rats gain weight. Natural food sources of this vitamin are liver, yeast and rice bran."

#### VITAMIN C

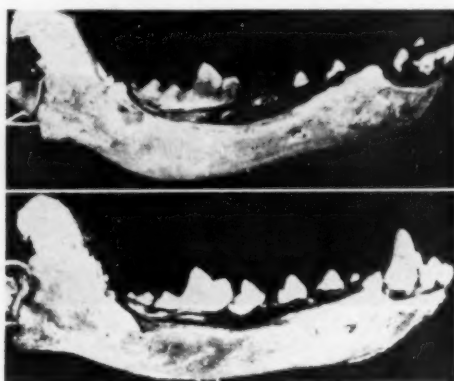
The usually recognized formula is C<sub>6</sub>H<sub>8</sub>O<sub>6</sub>. It has been designated as the anti-scorbutic vitamin. Chemical name is ascorbic acid.

**Description.**—Water soluble. Destroyed by oxidation at high temperatures.

**Functions.**—Essential for normal bone and tooth formation. It is necessary in the oxidation processes of the cells. The normal dog can synthesize vitamin C.

#### VITAMIN D

Commonly termed the anti-rachitic or "sunshine" vitamin. The usually recognized chem-



—Photo courtesy American Journal of Physiology.

**Fig. 6.** Vitamin D deficiency. The jaw bone shown in the upper picture was taken from a dog raised from puppyhood on a vitamin D-deficient diet. The jaw bone shown in the lower picture is normal, the dog from which it was taken having always had an adequacy of vitamin D.

far less vitamin D for normal bone calcification than do some larger breeds. Some of the larger breeds, especially the Danes, may require many times that of the smaller breed on a kilogram per body weight basis. The vitamin D requirement varies quite widely with the amount and ratio of calcium and phosphorus in the diet and conditions under which the pup is raised as well as the breed.

**Deficiency Symptoms.**—A) Incipient stage. Increased tendency for dental caries. Lowered resistance.

B) Advanced stage. Rickets and osteomalacia.

**Sources.**—Sunshine, fish liver oils, irradiated ergosterol, and egg yolks.

## VITAMIN E

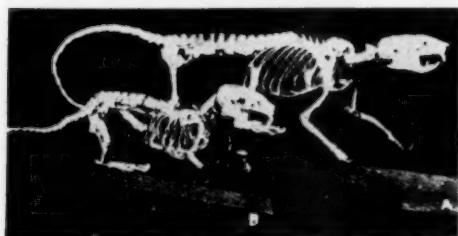
The usual designated chemical formula is  $C_{29}H_{50}O_2$ . It is termed the anti-sterility vitamin. Sometimes called by the chemical name of tocopherol.

*Description.*—Oil soluble, extremely stable. Inactivated by oxidation.

*Functions.*—The ordinary balanced ration apparently carries enough vitamin E for normal reproductive processes in the dog. The quantitative canine requirement is not known.

It has been reported by some workers that a deficiency of this vitamin in a dog has been responsible for abortion in the female and also resorption of the fetus. Loss of fertilizing power and libido in the male have also been attributed to a deficiency of this vitamin. The work we have reviewed does not appear to be conclusive in this respect.

*Sources.*—Wheat germ oil and wheat germ meal. Whole grain cereals and vegetable and corn oils.



—Photo courtesy H. C. Sherman.

Fig. 7. Calcium and phosphorus inadequacy and improper balance in the rat. A and B are twin brothers. Rat A was raised on a diet adequate in all minerals and in proper balance. Rat B was raised on a diet inadequate in calcium and phosphorus and the balance was incorrect.

## OTHER VITAMINS

There are several other factors which are recognized as being vitamins but whose functions are not yet established to the point of practical interest. Among these may be mentioned pantothenic acid, which Elvehjem and coworkers claim to have definitely shown to be required by newly weaned puppies and older growing dogs for normal growth. They report that the complicated nature of pantothenic acid deficiency, such as they have observed thus far, reduces the significance of the variety of symptoms which they have seen. Irregular cardiac activity in tachycardia, less frequency in bradycardia, nausea and vomit-

ing, intussusception and finally loss of fur and dry scaliness of the skin suggest an impairment of autonomic control and especially that of the parasympathetic nervous system. What factor or factors these symptoms are attributable to can not be seen in the light of present evidence. Then, too, there is a factor W, the gray hair factor,  $B_3$ ,  $B_4$ ,  $B_5$ , the anti-hemorrhagic vitamin K and possibly others that we might consume your time in discussing; but inasmuch as the function of these factors in canine nutrition and the requirements for them are not known, we merely list them at this time.

## CONCLUSIONS

In any consideration of the vitamin requirements and functions for dogs, it must be borne in mind that a deficiency of any one factor has a direct bearing on the functions of many of the other vitamins. A well-balanced ration of natural food products containing adequate amounts of all the known vitamins supplemented with quality oils for vitamin A and D fortification is the most satisfactory method of deficiency prevention. There may be cases in which an impaired adsorption in the animal organism can cause vitamin-deficiency diseases on ordinarily adequate diets. In cases of this kind, or in those in which an immediate response is essential, it is quite possible to take recourse to injection and oral feeding of the several pure vitamins now available.

## Surplus Lard

The large surplus of lard keeps the price of hogs below the desirable level. Better prices for hogs of the low-lard type as a premium for raising them would tend to overcome the surplus, according to an article by Dean Kildee of Iowa State College in *Wallace's Farmer*. The responsibility lies with the producers and packers, the dean declares. As in the production of other livestock for food the price is governed by the demand for what the carcass contains.



## Some Observations on Canine Nephritis\*

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DURING the past five years, a number of interesting cases of canine nephritis have presented themselves in the clinic. The following are reports of these cases:

**CASE 1.**—The animal was a seven-year-old female bird dog. She had been in the South most of her life. Sickness was first noticed several days prior to the examination. She showed emaciation, vomiting and marked weakness. She was in a state of coma. With the consent of the owner she was destroyed and a blood sample was taken. The results are presented in Table I.

**Autopsy.**—The heart was somewhat dilated, the liver showed some congestion. A few hookworms were present in the small intestine. The kidneys were alike in appearance. The capsules were rather adherent, and the surface irregular. The cortex was swollen, light in color, firm in consistency and mottled by many light grayish foci. The medulla showed moderate congestion. No histopathological examination was made.

**CASE 2.**—The animal was a four-year-old male Bull Terrier. He was brought to the clinic with a history of weakness and loss of flesh. The blood examination revealed the values given in Table I. The animal died and was not submitted for autopsy.

**CASE 3.**—The animal was a ten-year-old male Spitz. Sickness was noticed for two days only prior to entering the clinic on February 4, 1937. He was vomiting and refused both food and water. The breath had a foul odor. Blood examination was made on February 5th. The values are presented in Table I. The urine examination revealed 200 mg. per cent of albumin. The animal died February 8th.

**Autopsy.**—There is much congestion of the conjunctivae and oral mucosa. The lungs showed congestion and anthracosis; the liver shows some fatty changes. In the small intestine were three ascarids and four *Dipylidium caninum*. Some bloody mucus is present and the mucosa was congested. The kidneys appeared much alike. The capsules were rather adherent. Much of the cortex appears thin, light in color and firm in consistency. A rather large retention cyst was present in the right kidney. The prostate gland was swollen and soft. No histopathological study was made.

**CASE 4.**—The animal was a nine-year-old male Boston Terrier. He was brought to the clinic February 15, 1937, with the history that he had been losing flesh for some time and had developed a sore mouth. There was extensive necrotic stomatitis with foul odor. The feces had a foul odor. A blood examination was made on February 15th. The results are presented in Table I. The urine examination revealed a 4-plus albumin and some granular casts. The dog was killed on February 19, 1937.

**Autopsy.**—The oral mucosa showed extensive necrosis and emitted a very foul odor. The conjunctivae were markedly congested. There was some dilatation of the ventricles of the heart. Both the bicuspid and tricuspid valves showed some thickening and the intima of the aorta appeared somewhat rough. The liver showed some congestion. Changes in the two kidneys were very similar. The capsules were firmly adherent. The kidney is contracted, firm and very much pitted on the surface. On section the cortex was light in color and showed evidence of fibrosis. Some small cysts were present in the cortex. There appeared to be some dilatation of the tubules in the medulla. The bladder was distended with cloudy, light colored urine. The prostate gland was enlarged, soft and cystic. A large cavity filled with pus was present in the central portion.

**Histopathology.**—The kidneys showed diffuse interstitial nephritis characterized by marked increase of lymphocytes and macrophages which had produced atrophy and necrosis of the tubular epithelium with replacement fibrosis in some areas. There was a recent and terminal necrosis of the tubular epithelium.

**CASE 5.**—The animal was a six-year-old female Chow. She was brought to the clinic October 18, 1937, with the history of having been ill for about five months. There was diarrhea, ulcerative stomatitis and foul breath. She died during the night of October 21st. A blood examination was made on October 19th. Results are shown in Table I.

**Autopsy.**—The thoracic lymph nodes showed some swelling. In some parts of the lung there were small areas of pneumonia. On section these were definitely outlined and contained what appear to be numerous small foci of necrosis. The largest of the above areas is about 3 cm. in diameter. Both the bicuspid and tricuspid valves showed some nodular thickening of the free margins, and there were a few small hemorrhages at the bases of the valves. The

\*From the Animal Pathology Section, Michigan Agricultural Experiment Station; published as journal article No. 395, n.s., of the Station.

†Resigned July 1, 1938.

TABLE I—Blood Findings in 16 Cases of Canine Nephritis

CASE No.	HEMOGLOBIN		RED CELLS (PER CMM.)	WHITE CELLS (PER CMM.)	GLUCOSE (MG. %)	NPN (MG. %)	CREATININE (MG. %)	UREA (MG. %)	URIC ACID (MG. %)	NaCl (MG. %)
	MG. %	%								
1	15.6	110	6,110,000	15,100	114.94	272.72	4.68	—	1.59	485.00
2	10.6	72	3,140,000	11,300	173.91	400.00	6.00	—	1.00	490.00
3	—	—	—	—	123.45	120.00	3.33	116.00	1.43	360.00
4	6.5	44	2,410,000	10,050	121.95	300.00	5.66	150.00	3.90	555.00
5	13.2	92	6,130,000	17,600	169.49	600.00	7.50	X	—	445.00
6	12.4	84	5,160,000	40,200	133.33	258.00	6.00	X	1.33	495.00
7	10.6	74	4,240,000	13,250	114.28	85.70	15.80	60.00	2.00	490.00
8	9.4	62	3,730,000	12,600	111.11	34.48	1.38	23.00	1.70	500.00
9	14.4	96	5,860,000	6,800	129.03	300.00	7.50	166.00	1.60	—
9	13.6	92	4,475,000	4,600	67.00	500.00	10.36	176.00	1.60	400.00
9	13.6	92	3,710,000	8,150	105.26	300.00	12.00	150.00	1.14	350.00
10	14.7	101	4,680,000	14,350	129.87	85.70	1.86	42.85	1.18	450.00
11	3.6	24	960,000	7,400	185.17	X	4.54	150.00	2.10	480.00
12	12.0	85	4,560,000	23,200	111.11	200.00	5.00	65.21	2.06	500.00
13	16.0	110	5,180,000	22,150	175.43	176.47	6.00	100.00	1.19	500.00
14	19.8	138	7,780,000	8,250	80.00	200.00	5.76	X	1.33	470.00
15	14.6	100	5,160,000	22,550	130.00	35.00	1.20	15.00	1.20	490.00
16	18.9	130	8,440,000	38,800	142.85	63.15	2.77	100.00	1.33	356.00

X = Too high to read.

pancreas was congested. Scattered through the pancreas were several light areas 1 to 5 mm. in diameter. The liver was mottled, suggesting degenerative changes. In the pyloric region of the stomach there is an ulcer about 4 mm. in diameter which showed some hemorrhage. The upper levels of the small intestine were congested. Both kidneys have much the same appearance. They were smaller than normal and very irregular in outline. The capsules striped with difficulty and left a rather rough and irregular surface. On section, the cortex was firm, irregular in thickness and showed a great deal of fibrosis.

*Histopathology.*—The kidneys showed subacute, focal, interstitial nephritis characterized by interstitial accumulation of lymphocytes and macrophages leading to tubular changes and replacement fibrosis. The renal corpuscles showed the secondary changes described in the discussion.

*CASE 6.*—The animal was a two-year-old male Springer Spaniel. He was brought to the clinic on October 19, 1937, with the history that he had been losing weight. He was vomiting, thirsty, had a bad breath, and would not eat. He had been treated for gastroenteritis without success. A blood examination was made on the day of entry. The results are seen in Table I. The urine examination revealed 1-plus albumin. The sediment contained numerous epithelial cells, pus cells and bacteria. The animal was killed October 21st.

*Autopsy.*—The lungs showed extensive anthracosis. In the left atrium of the heart there were several small, light colored, elevated lesions. Some of these appear as nodules, others as plaques. In the pulmonary artery, just above the semilunar valves, there were numerous lesions of similar nature; one area about 1 cm. in diameter was a conglomerate mass of nodules. In most of the lesions there apparently is some calcification. There were many plaques present in the pulmonary arteries

well up into the lungs. The kidneys are much alike. The capsules striped with difficulty and left a rough surface. On section, the cortex was seen to be swollen and showed what appeared to be fibrosis. Numerous grayish-white foci 2 to 4 mm. in diameter are scattered quite generally through the cortex and medulla. There is some congestion.

*Histopathology.*—The kidneys show diffuse subacute interstitial nephritis characterized by accumulation of lymphocytes and macrophages leading to atrophy and replacement fibrosis.

*CASE 7.*—The animal was a two-and-one-half-month-old male Doberman. He was brought to the clinic October 19, 1937, with the history of having been treated for sore throat and diarrhea. He had also been treated with sulfanilamide by the owner.

October 20th, a urine sample revealed 4-plus albumin. There were numerous casts, epithelial cells, leucocytes, red cells and bacteria in the sediment. With the owner's permission the animal was killed. Blood was taken at the time of killing. The results are seen in Table I.

*Autopsy.*—The liver was congested. There was some congestion of the stomach and intestine. The kidneys had the same appearance. The capsules were somewhat adherent and left a rough and irregular surface when removed. The cortex was of even, light-clay color and firmer than normal. Mild congestion was noted in the medulla.

*Histopathology.*—The kidneys showed diffuse glomerulonephritis or nephrosis characterized by hyalinization of the glomerular capillaries, many of which showed shrunken tufts and great distention of Bowman's capsule. The interstitial connective tissue shows little nephritis, except for a few lymphocytes and macrophages.

*CASE 8.*—The animal was a fourteen-year-old female English Bulldog. She was brought to the clinic November 30, 1937, with the history that she had had a severe cough and dyspnea

for some time. Heart tonics and respiratory sedatives gave relief for a short time. Symptoms then grew worse, and edema developed under the sternum and along the ventral part of the neck. Blood was taken when the animal was killed. The results are found in Table I.

**Autopsy.**—There was much edema of the subcutaneous tissues over the sternum and neck. The lungs showed moderate congestion. Considerable emphysema was present especially in the diaphragmatic lobes. The left anterior lobes felt nodular and showed some atelectasis, apparently due to some bronchiolectasis. There was an excess of pericardial fluid. The right atrium and ventricle were markedly dilated. A large area of the myocardium of the left ventricle near the base of the heart appeared depressed and firm. At the base of the aortic arch were two spherical growths about 1.5 and 2.5 cm. in diameter which had the appearance of neoplasms and apparently caused pressure on the aorta and pulmonary artery. The tricuspid and bicuspid valves were thickened and there were some nodules on their free margins, an excess peritoneal fluid was present. The spleen contained numerous spherical growths 2 to 2.5 cm. in diameter. The liver was congested. Several areas 1 to 2 cm. had the appearance of neoplasms. There may have been some increase of interlobular connective tissue. A neoplasm about 4 cm. in diameter and somewhat mushroom shaped was found in the wall of the small intestine. The kidneys appeared to be alike. The capsules were very adherent to numerous scarred areas. The cortex was atrophied and almost absent in some of the scarred areas. Some small retention cysts are present in the left kidney.

**Histopathology.**—The kidneys show subacute, focal, interstitial nephritis characterized by productive tissue changes and fibrosis leading to tubular atrophy and necrosis. The nephrons outside of these focal lesions showed various degenerations. Some of the glomerular tufts showed hyalinization while others had metastatic tumor cells from a primary neurocytoma.

**CASE 9.**—The animal was an aged male Collie. He was brought to the clinic on January 5, 1938, with the history of having lost flesh for about a month. He showed anorexia and vomited often. Blood examinations were made on the day of entrance to clinic, January 10th, and January 12th. The results are shown in Table I. The urine examination revealed a marked albumin reaction. On January 10th the urine contained an abundance of albumin, some bladder cells and numerous sperms. The urine on January 12th was very bloody. The animal was destroyed.

**Autopsy.**—There was some congestion of the peritoneum over the small intestine. The liver showed some congestion and some mottling, suggestive of fatty changes. The small intestine showed patchy congestion. The kidneys

were much the same in appearance. The kidneys were contracted. The capsules were adherent and left an irregular, nodular surface when removed. The cortex was light in color, very firm and irregularly atrophied. Between the cortex and medulla there was a zone of congestion, but the medulla appeared paler than normal. The bladder appeared somewhat thickened, and its mucosa was quite markedly congested and hemorrhagic.

**Histopathology.**—The kidneys showed a diffuse subacute interstitial nephritis with secondary lesions of the glomeruli and terminal, acute, fibrinous glomerulitis. The lesions were characterized by productive tissue changes leading to tubular atrophy and necrosis. Secondly, the renal corpuscles showed marked thickening of Bowman's capsule and glomerular adhesions with some increase of connective tissue in the capillaries. In the terminal stage there was serofibrinous exudation of fluids in the tissue spaces of the glomeruli.

**CASE 10.**—The animal was an eleven-year-old male. He was brought to the clinic with a history of constipation and enlarged abdomen. Marked ascites and anemia were found. The animal was destroyed. A blood sample was taken on the day of entry. The results are given in Table I. The urine examination revealed some albumin, some bladder cells, numerous pus cells, some granular casts and a great deal of granular material, apparently amorphous phosphate. The animal was killed with the owner's consent.

**Autopsy.**—There was marked edema of the ventricular subcutaneous tissues of the neck and abdomen. Most of the lymph nodes were edematous. There was some excess pericardial fluid. The right atrium of the heart was enormously enlarged. There was an irregular nodular thickening of the tricuspid valve. The right ventricle appears somewhat dilated. About two quarts of sanguineous fluid containing clumps of fibrin was present in the peritoneal cavity. The liver was enlarged, mottled and congested. There was some indication of degenerative changes, and fibrosis. A few hookworms were found in the small intestine. The kidneys were much alike. The capsules were rather adherent and left an irregular surface when removed. Numerous small retention cysts were noticed. The cortex was pale and firm. Apparently there was dilatation of the tubules of the medulla.

**Histopathology.**—The kidneys showed subacute, interstitial nephritis characterized by accumulations of lymphocytes and macrophages in the cortex and a marked fibrosis in the interstitial tissue of the outer medulla. Approximately one-third of the renal corpuscles were partially or completely hyalinized and reduced to one-half or one-third in size, yet no appreciable ischemia of the cortex was observed. Sev-



eral small lesions of a metastatic sarcoma were present in the cortex.

**CASE 11.**—The animal was a seven-year-old male Fox Terrier. He was brought to the clinic for examination. As the blood and urine examinations led to a diagnosis of nephritis the animal was destroyed. A blood sample revealed the values given in Table I. The urine examination revealed marked albuminuria and many leucocytes and epithelial cells.

**Autopsy.**—The animal is very anemic and emaciated. Both of the kidneys showed marked chronic nephritis. The capsules striped with difficulty, leaving a surface showing numerous irregular brownish colored, raised areas 1 to 4 mm. in diameter surrounded by somewhat larger white shrunken patches. Some raised areas resemble small cysts. On section the tissue appeared swollen and edematous. Many of the white shrunken areas extended through the cortex into the medulla. The cortex varies in thickness from 1 mm. to 3 mm. In the medulla there appeared to be some distention of the tubules.

**Histopathology.**—The kidneys showed chronic, focal, interstitial nephritis characterized by productive tissue changes leading to tubular atrophy and necrosis. Secondly, many glomeruli showed a partial or complete hyalinization along with marked glomerular adhesions and thickening of Bowman's capsule. The productive tissue changes had produced many cystic tubules in the medulla. There had been some metaplasia of the ducts of Bellini.

Five additional cases were diagnosed as nephritis, but these animals were taken home and no further histories were obtained. The blood findings are listed in Table I as Cases 12 to 16 inclusive.

#### DISCUSSION

Sixteen cases in which nephritis was diagnosed by means of blood and urine examinations are described. Ten animals were submitted for autopsy. Eight of these were destroyed just prior to the autopsy. The other two died during the night prior to the autopsy. One ani-

mal died and was taken home by the owner. Five animals were taken home by the owners and no further history was obtained. The ages ranged from 2.5 months to 14 years, with fairly even distribution above two years of age.

Symptoms in the various cases showed some differences. Case 8 showed cough and dyspnea accompanying heart disease. Case 10 showed ascites. Anorexia, weakness, loss of weight and vomiting were the most prominent symptoms. Other symptoms noted in some cases were excessive thirst, stomatitis, diarrhea and frequent urination. The symptoms alone were not characteristic enough to make a definite diagnosis.

Diagnosis was based on blood and urine examinations. Blood glucose was high in some cases, but this was not dependable. Creatinine is very readily eliminated in the urine, and increase of it in the blood is definite indication of kidney impairment. Associated with this were high values for non-protein nitrogen and urea. In the urine, the presence of albumin, casts and cells was considered diagnostic also. In Cases 8, 10 and 15 the creatinine values gave no indication of kidney impairment. The diagnosis was based on the urinalyses.

Eight of the ten cases studied microscopically showed a nephritis of a subacute or chronic nature. In most respects the lesions were similar. The disease usually began in the interstitial connective tissue of the cortex and was characterized by focal accumulations of lymphocytes and mononuclear phagocytes. (Fig. 1.) Later tubular atrophy and necrosis occur followed by replacement fibrosis. In a few cases the process appeared to have started with a

#### CAPTIONS TO ILLUSTRATIONS ON OPPOSITE PAGE

Fig. 1. Infiltration of lymphocytes and macrophages in the interstitial tissue of cortex (x 32).

Fig. 2. Proliferation of connective tissue in the interstitial tissue of cortex (x 141).

Fig. 3. Distention of tubules and atrophy of tubular epithelium of cortex (x 148).

Fig. 4. Serofibrinous exudate in renal corpuscle (x 130).

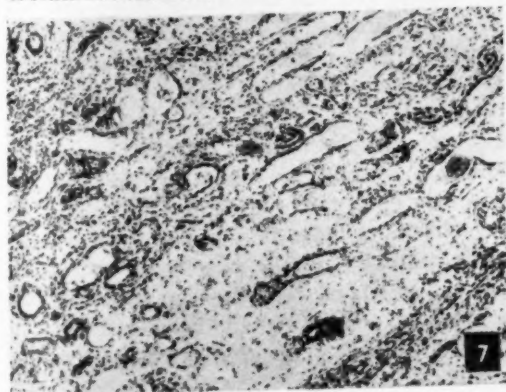
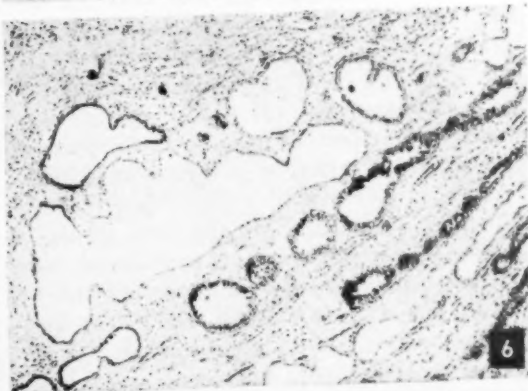
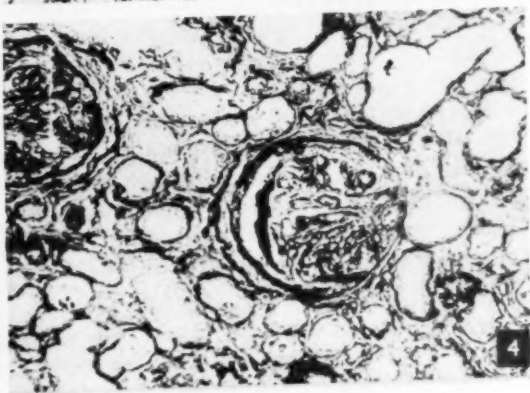
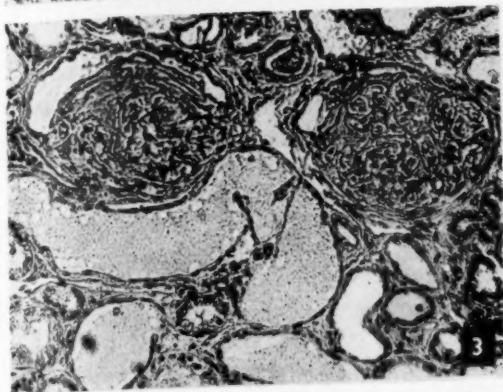
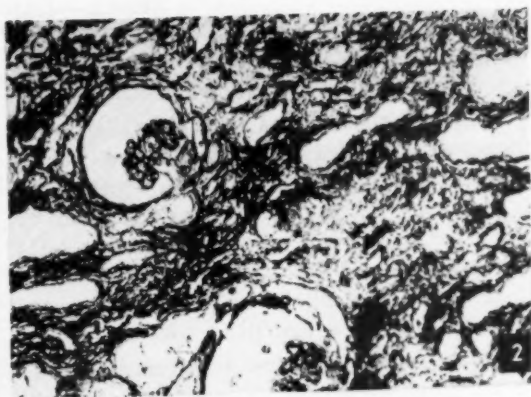
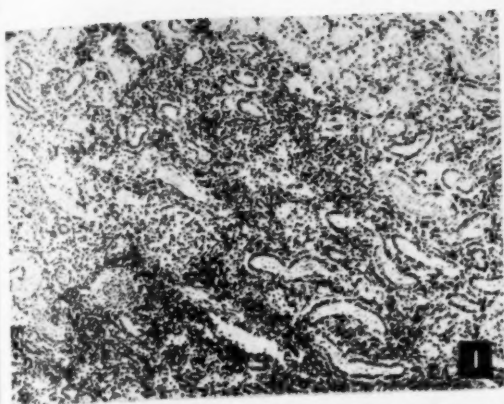
Fig. 5. Atrophy of glomerulus and distention of Bowman's capsule (x 72).

Fig. 6. Proliferation of connective tissue and atrophy of tubules in the medulla (x 67).

Fig. 7. Distention of tubules in medulla (x 42).

Fig. 8. Degeneration and necrosis of tubules in renal cortex (x 130).





proliferation of fibroblasts leading to atrophy and necrosis of the tubules. (Fig. 2.)

Some of the tubules in these focal areas became distended with fluids and debris which caused atrophy of the epithelium. (Fig. 3.) The distention was initiated by constriction of the tubule at a lower level by connective tissue. There were numerous casts formed from the desquamated cells and other products in the tubules.

The renal corpuscles sometimes showed a terminal, serofibrinous exudate with light staining granular debris suggestive of albuminuria. (Fig. 4.) In other corpuscles, Bowman's capsule was greatly thickened with concentric rings of connective tissue. The glomeruli showed adhesions to the capsule and many showed partial to complete hyalinization of the tufts. This latter condition along with the increased tubular pressures will go far to explain the blood picture found clinically.

In two or three of the cases there appeared to be enough evidence to justify calling the condition a glomerulonephritis. In Case 7, the renal corpuscles show marked hyalinization of the glomerular capillaries. The tufts in many instances appear shrunken, while Bowman's capsule was greatly distended. (Fig. 5.) If the process is glomerular in origin, it differs very much from the glomerular lesions described in humans. In the latter, the first lesion is a diffuse proliferation of endothelial cells which become greatly swollen, followed by formation of hyalin fibers which lead subsequently to complete hyalinization. At the same time epithelial crescents are formed by proliferative processes of Bowman's capsule. There is also an exudate process characterized by collection of polymorphonuclears, albuminous serum, fibrin, and hemorrhage. In the dog, the endothelial cells become greatly swollen but not greatly increased in numbers. The formation of hyalin fibers and some of the exudative processes were about the only changes similar to those described in man. The process is not diffuse in dogs as it is in man.

Case 10 showed a peculiar phenomenon in that approximately one-third of the renal corpuscles were partially or completely

hyalinized and reduced to one-half to one-third in size. We are led to assume that this may be the result of a development anomaly since in inflammation one would expect some ischemic changes in the cortex due to the loss of so many corpuscles, yet this is not true.

In parts of the cortex not involved by the diffuse and focal lesions described above, many of the nephrons showed various degenerative processes such as cloudy swelling, vacuolar degeneration, fatty degeneration, and necrosis. There was a pronounced desquamation of the tubular epithelium.

The medulla showed numerous lesions similar to those described in the interstitial tissues of the cortex. (Fig. 7.) The tubules were sometimes very cystic in the medulla due to the cicatrization. (Fig. 6.) In one case, the ducts of Bellini showed a marked metaplasia of the epithelium.

Three other cases studied were essentially nephrosis characterized by degenerative changes and necrosis. (Fig. 8.)

The findings in the urine such as albuminuria, casts, and desquamated tubular cells corresponded well with the lesions seen in sections of the kidneys. In case of a marked albuminuria there is usually a marked increase of granular material in both the capsular spaces of the renal corpuscles and the lumina of the tubules. (Fig. 3.) The collecting tubules usually showed some casts along with many desquamated cells.

Several factors entered to help explain the process leading up to the blood picture clinically. In the beginning some toxin or bacteria initiated the accumulations of lymphocytes or macrophages or the proliferation of fibroblasts. Each process reduced the capillary circulation, leading to tubular atrophy and necrosis. The replacement of normal structure by cicatricial tissue also destroyed capillaries. The productive tissue changes undoubtedly would gradually impinge on the arterioles, thus leading to changes described in some of the glomeruli. In other glomeruli, the toxins or bacteria may have produced lesions described.

The loss of so many renal corpuscles and

# A Comparative Study of Pullorum Disease in Barred Plymouth Rock and New Hampshire Red Chickens\*

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DURING the past three years or more there has been a growing tendency on the part of Virginia poultrymen to think of New Hampshire Red chickens as being more susceptible than other breeds of chickens to pullorum disease. They not only feel that the chicks of this breed are more susceptible and die in greater numbers from the disease than chicks of other breeds, but they also maintain that when the grown birds of this breed are tested by the agglutination test a greater number of reactors occur, and that reactors continue to recur even on repeated tests at short intervals, indicative of additional birds becoming affected.

These reports by poultrymen have been essentially upheld by poultry inspectors in Virginia and by those in charge of the testing program for the control and eradication of pullorum disease. It might be stated in addition that the reports of the diagnostic laboratory at this institution reveal that a greater percentage of New Hampshire Red chicks sent in for diagnosis are found to be affected with pullorum disease than chicks of other breeds. This information, however, does not necessarily add to or detract from the facts in the case, as there can be no correlation on this basis due to the many variable factors, as man-

agement, source of stock, numbers, etc., that would have direct bearing upon such results.

In view of these opinions and reports it was decided to make this comparative study of Barred Plymouth Rock and New Hampshire Red breeds.

## MATERIALS AND METHODS

On February 24, 1939, we received 144 Barred Plymouth Rock eggs and an equal number of New Hampshire Red eggs from a New England breeder. The pullorum-disease status of the flocks from which the eggs originated was the same for both lots. That the eggs came from practically disease-free flocks is evidenced by the record of the early life of the chicks.

Of the 144 Barred Plymouth Rock eggs six were broken on arrival, 18 were infertile, and six had dead germs. From this group 100 chicks were obtained as the result of 69.3 per cent of the eggs hatching. Of the New Hampshire Red eggs four were broken on arrival, twelve were infertile, and six had dead germs. From this group 99 chicks were obtained as the result of 68.7 per cent of the eggs hatching. The chicks were removed to brooder houses with coal brooders for heat, kept entirely away from other chickens during the brooding period, and the two groups were handled as nearly in an identical manner as possible. One chick from each group died during the first week. A careful bacteriological examination of these failed to reveal *Salmonella pullorum* as the cause of death. At 8 weeks of age the heat was removed and each group was furnished with a sun porch containing a raised floor. At this time several males were caponized and 25 birds from each group, picked at random and including both males and females, were moved to a house and lot that contained chickens the previous year. No special precautions were taken to clean or disinfect this place before placing these birds in it.

The first agglutination test for pullorum disease was run on the serums from all of these birds on August 29, 1939, or at the time they were 5 months of age. At that time all the birds were negative to the standard tube test, which proves that both Barred Plymouth Rock chicks and New Hampshire Red chicks can be

\*From the Virginia Agricultural Experiment Station; presented before the Section on Poultry at the 77th annual meeting of the AVMA, Washington, D. C., August 26-30, 1940.

(Continued from preceding page)

tubules reduces the filtration and absorption surfaces and thus causes retention of the products of filtration in the blood stream and accounts for the blood picture of cases recorded in Table I.



TABLE I—Results of Periodic Agglutination Tests with Serums of Barred Plymouth Rock Chickens Exposed to *S. Pullorum* Infection Beginning September 11, 1939

BIRD No.	DATES TESTS PERFORMED AND DILUTIONS											
	8-29-39		10-23-39		11-20-39		1-5-40		3-7-40		5-8-40	
	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50
288	—	—	—	—	—	—	—	—	—	—	—	—
222	—	—	—	—	—	—	++	+	±	±	++	+
264	—	—	—	—	—	—	—	—	—	—	—	—
249	—	—	—	—	±	T	T	T	±	±	+	±
229	—	—	—	—	—	—	—	—	—	—	—	—
299	—	—	—	—	—	—	—	—	—	—	—	—
261	—	—	—	—	—	—	++	+	++	+	+	±
251	—	—	—	—	—	—	—	—	—	—	—	—
215	±	—	++	T	±	T	±	T	±	T	±	T
235	—	—	—	—	—	—	±	T	T	T	T	T
208	—	—	—	—	—	—	—	—	—	—	—	—
211	—	—	—	—	—	—	—	—	Killed 1-8-40		—	—
225	—	—	—	—	—	—	—	—			++	+
277	—	—	—	—	—	—	—	—	—	—	—	—
279	—	—	—	—	—	—	—	—	—	—	—	—
212	—	—	—	—	—	—	—	—	—	—	—	—
263	—	—	—	—	—	—	—	—	—	—	—	—
202	—	—	—	—	—	—	—	—	—	—	—	—
214	—	—	—	—	—	—	—	—	—	—	—	—
247	—	—	—	—	—	—	—	—	—	—	±	—
209	—	—	—	—	—	—	—	—	—	—	±	—
294	—	—	—	—	—	—	—	—	—	—	+	±

TABLE II—Results of Periodic Agglutination Tests with Serums of New Hampshire Red Chickens Exposed to *S. Pullorum* Infection Beginning September 11, 1939

BIRD No.	DATES TESTS PERFORMED AND DILUTIONS											
	8-29-39		10-23-39		11-20-39		1-5-40		3-7-40		5-8-40	
	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50	1:25	1:50
455	—	—	—	—	—	—	+++	+++	++	+	++	+
411	—	—	—	—	±	T	+++	+++	++	+	++	+
469	—	—	—	—	—	—	—	—	—	—	+++	++
450	—	—	—	—	—	—	—	—	—	—	++	+
461	—	—	—	—	—	—	—	—	—	—	+	—
406	—	—	—	—	—	—	—	—	—	—	—	—
418	—	—	+++	+	++	+	++	+	++	—	++	+
435	—	—	—	—	—	—	—	—	—	—	+++	++
477	—	—	—	—	Killed because of injured wing				—	—	—	—
429	—	—	—	—	±	T	+++	++	++	+	+++	++
427	—	—	—	—	—	—	—	—	—	—	+	±
432	—	—	—	—	—	—	—	—	—	—	+	±
445	—	—	—	—	—	—	+	±	+++	++	+++	+++
428	—	—	—	—	—	—	—	—	—	—	—	—
420	—	—	—	—	—	—	—	—	—	—	—	—
408	—	—	+++	+++	+++	+++	+++	+++	+++	+++	++	+
448	—	—	—	—	—	—	—	—	+	±	+	±
415	—	—	—	—	—	—	—	—	—	—	—	—
459	—	—	—	—	—	—	—	—	—	—	++	+
449	—	—	—	—	—	—	—	—	—	—	—	—
481	—	—	—	—	—	—	—	—	—	—	—	—
439	—	—	—	—	—	—	—	—	—	—	—	—
401	—	—	—	—	—	—	—	—	—	—	—	—
447	—	—	—	—	—	—	—	—	—	—	—	—

+++ = Complete agglutination.  
 ++ = Less complete agglutination.  
 + = Still less complete agglutination.

± = Partial agglutination.  
 T = Trace agglutination.  
 — = No agglutination.



raised free from pullorum disease providing the chicks are free from the disease at the outset and providing the infection is not brought to them from other sources.

On September 22, 1939, ten females and one male from each of the two breeds were placed in two separated houses and yards that had not contained any chickens for three years, to learn how long it would be possible to maintain these free from pullorum disease under those conditions. Similarly, twelve females from each breed were moved to a new house and lot that had never before contained chickens to learn what would happen under those conditions.

After the results of the first test, many of the cockerels were disposed of and the remaining groups were tested at frequent intervals.

On September 11, 1939, two birds that were positive reactors to the pullorum-disease test were placed in the yard containing the group of 50 birds that were moved May 18, 1939. In addition, on September 22, 1939, 30 cc. of a saline suspension of *S. pullorum* (24-hour culture) was placed in the drinking water for these birds. Another 30-cc. portion of a 24-hour culture of these organisms was added on October 11, 1939.

Tables I and II give the results of periodic agglutination tests by the tube method on these groups of birds up until they are past 14 months of age.

#### EXPERIMENTAL RESULTS

From the data in tables I and II it may be noted that during the first two months following exposure to infection there was very little difference in the number of reactors in the two groups. Subsequent tests, however, revealed increasing numbers of reactors among the New Hampshire Reds, with more complete agglutination in most cases than among the Barred Plymouth Rocks.

If only those birds giving a one plus reaction in a dilution of 1:50 are considered as being infected, there are five times as many New Hampshire Red birds infected as there are Barred Plymouth Rock birds at the close of the experiment. Two reactors out of 22 birds among the Rocks as compared with ten reactors out of 24 birds among the Reds is significant statistically when the data are analyzed according to

Kenney.<sup>1</sup> That is, the ratios of 10/24 and 2/22 are significantly different. The probability that a difference as large as this could happen only by chance once in a hundred tests. In other words it is significant at the 1 per cent level.

Among the three groups that were placed on clean ground and among which an attempt was made to avoid all infection, only one New Hampshire Red has reacted to the test. The source of this infection is not known, but it may have been introduced into the yard by flying birds.

#### SUMMARY

In a comparative study of the susceptibility of Barred Plymouth Rock and New Hampshire Red breeds of chickens to pullorum disease it was found that 99 Barred Plymouth Rock chicks out of 100 and 98 New Hampshire Red chicks out of 99 could be raised until 8 weeks of age, and that all were free from pullorum disease as indicated by a negative reaction to the standard tube agglutination test at the age of 5 months.

Exposure to pullorum infection at the age of 5 months by placing two reacting chickens with a group of 22 Barred Plymouth Rock pullets and a group of 24 New Hampshire Red Pullets, and by placing two 30-cc. portions of a 24-hour broth culture of *Salmonella pullorum* in the drinking water used by these birds over a period of about two weeks, resulted in infection, according to results of periodic agglutination tests on the serums of these birds until they were past 14 months of age, as follows: Two out of 22 Barred Plymouth Rock birds became infected and 10 out of 24 New Hampshire Red birds became infected. This difference in susceptibility of the two breeds to pullorum disease is statistically significant.

Milk in summer may contain twice as much vitamin D as winter milk, says a British nutritionist.—*Science News Letter*.

<sup>1</sup>Kenney, John F.: *Mathematics of Statistics* (D. Van Nostrand Co., New York, 1939).

# The Veterinarian in the Conquest of Human Disease\*

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THE EXPENDITURE of public funds for erecting and equipping a new building should be predicated on the fact that a real need for such a building exists and that the structure will be used for purposes important to the state and to the nation. The edifice we are dedicating at this time was greatly needed and is intended for an extremely important purpose: the training of those who will be entrusted with the health of a billion dollar livestock industry and charged with the suppression of animal diseases that constitute a threat to human health.

The natural desire of all normal human beings is to live long, to live happily and to contribute something to the welfare and the well-being of society. The most important factor in the realization of these objectives is health, for disease is truly the curse of all living things.

The modern concept of the medical sciences is no longer that of distinctly separate and frequently narrow fields of endeavor in which each science, whether it be medicine, pharmacy, dentistry or veterinary medicine, stands alone. Instead, with each passing year it is becoming more apparent that all the medical sciences are definitely related and that each is an important and vital part of the whole. The interrelationship of human and veterinary medicine is especially evident and important.

Fundamentally, veterinarians and physicians are concerned with identical problems. These are, briefly, the diagnosis of disease, its treatment or alleviation and its prevention and control.

In combating animal diseases of importance to human health physicians and veterinarians usually can be depended upon to cooperate when each understands the

functions and limitations of the other. Neither can do the task satisfactorily alone.

It may appear to many that the relationship of the veterinarian to diseases of animals is largely economic and the same idea may prevail concerning the relationship of the physician to human disease. More idealistically, however, I like to believe that both the veterinarian and the physician are motivated in their daily rounds of activity by a fundamental desire to alleviate suffering and that each possesses a genuine sense of curiosity that makes every patient an unexplored mechanism, the exploring of which may reveal new truths that will be useful in reducing suffering and preventing diseases in others.

It is apropos at this time to mention briefly a particularly outstanding achievement of the veterinary profession that was made possible by a discovery nearly 50 years ago by scientists in the U. S. Bureau of Animal Industry. I refer to the conquest of Texas fever of cattle. Smith and Kilborne<sup>1</sup> discovered that this disease was caused by a protozoan parasite. For the continuation of its life cycle this parasite depended on the cattle tick which served as an intermediate host. Important as this discovery was to the cattle industry of the South, the knowledge gained opened the way to an understanding of the cause and transmission of many diseases of human beings including yellow fever, Rocky Mountain spotted fever, typhus and malaria. Possibilities for further discoveries based on the fundamental observations of Smith and Kilborne<sup>1</sup> still exist in the fields of veterinary and human medicine.

## INTESTINAL PARASITES

The veterinary profession also has contributed immeasurably to the relief of human suffering in still another field: the

\*From the Division of Experimental Medicine, The Mayo Foundation; delivered on the occasion of the dedication of the new building of the Division of Veterinary Medicine, Colorado State College, Fort Collins, Colo., February 20, 1940.

<sup>1</sup>Smith, T., and Kilborne, F. L.: Texas fever. BAI, USDA, Bul. 1 (1893).

treatment and control of certain intestinal parasites by a class of drugs known as anthelmintics. Veterinarians searching for a suitable drug to combat hookworm in dogs discovered two that were effective: carbon tetrachloride, and later, tetrachlorethylene. Since these drugs acted successfully against hookworm infestations in dogs, it was reasonable to presume that similarly good results would follow their use in human beings affected by the same parasite. Trials proved this supposition correct; the results among human beings were entirely satisfactory. Since it has been estimated that hookworms infest more than 100 million persons in our own and tropical countries, the importance of this discovery can hardly be overemphasized.

In the pursuit of his professional activities, the veterinarian functions in four distinct though somewhat overlapping fields: (1) administering to sick and injured animals, (2) protecting our livestock industry against losses from infectious and parasitic diseases, (3) the investigation of problems of fundamental importance to the medical sciences and (4) the protection of the public against diseases of animals that are communicable to man. The last function constitutes a definite responsibility and one in which complete coöperation with the physician is essential if the public health is to be properly served.

"Public health," Brumley<sup>2</sup> has said, "is not a science standing in isolated grandeur. Rather it is a coöperating and coördinating focus, at which meet all of those sciences which may assist in surrounding man with every safeguard which may protect and prolong life."

#### CONSERVATION OF LIVESTOCK A MAJOR PUBLIC HEALTH ENTITY

The veterinarian has contributed much to the health of the American people by the conservation of domestic livestock, thus assuring a wholesome and adequate supply of meat and milk for the consuming public, and by protecting the public from the dis-

eases of animals that may be transmitted to man. The list of such diseases is not long, but it includes a few diseases that may be fatal and some that leave in their wake complications followed by semi-invalidism for prolonged periods.

A notable recognition of the potential usefulness of the veterinarian in the program for the achievement of better public health was the announcement during the current academic year that Harvard University had provided for the admission of qualified graduates from approved veterinary schools to the Harvard School of Public Health.<sup>3</sup> Such students are permitted to take the regular course on the same basis as graduates from approved medical schools. Students accepted become candidates for the degree of Master of Public Health. The splendid opportunities for additional training provided by such a course should appeal impressively to young graduates in veterinary medicine who desire to equip themselves properly for a career in research, teaching or the field of public health.

#### FEDERAL MEAT INSPECTION

An important function in which the veterinary profession can take justifiable pride is the meat-inspection service administered by the Bureau of Animal Industry of the U. S. Department of Agriculture. Approximately 850 veterinarians are required for this work and appointment to the service is attained through a competitive civil service examination. On June 30, 1939, inspection of cattle, sheep, swine, goats and, to a limited extent, horses was conducted in 646 separate establishments in 242 cities and towns of the United States.<sup>4</sup> An idea of the magnitude of the task performed by our federal meat-inspection service may be obtained by the following figures. During the year 1939, the total number of cattle, sheep, swine, goats and horses slaughtered under federal supervision was slightly in

<sup>2</sup>The Harvard School of Public Health. Official Register of Harvard Univ. (Harvard University Press, Cambridge, Mass., April 1939), xxxvi, No. 20, 45 pp.

<sup>4</sup>Rpt. Chief of the BAI, USDA (Sept. 1939), 82 pp.

<sup>3</sup>Brumley, O. V.: Veterinary education and training for public health. J.A.V.M.A., xcii (March 1938), pp. 366-380.



excess of 71 million. As a consequence of the veterinary inspection which is required for all meat prepared for food by establishments engaged in interstate commerce, 228,542 carcasses were condemned as unfit for human food. In addition, parts of carcasses from 763,020 animals were considered unfit for human consumption. Also, 986,510 livers from adult cattle and 41,239 livers from calves were condemned as unfit for human food.

Although the inspection of 71 million animals is a stupendous task, this figure represents only about 65 per cent of the nation's meat supply. The remaining 35 per cent is offered for sale without the benefit of any inspection whatever or under city, county or state inspection, which is frequently inadequate owing to lack of a trained personnel and the failure of public health authorities to insist that meat sold intrastate should have as adequate inspection as that sold interstate.

Our federal meat-inspection service is probably the finest in the world. Its service in hygiene and sanitation is of incalculable worth to the health of the nation.

#### TUBERCULOSIS

In any discourse on what the veterinarian has contributed to the nation's health the campaign against bovine tuberculosis must at least be mentioned. The notable achievement of American veterinarians in practically eradicating tuberculosis of cattle has incited the admiration and, I might say, the envy of physicians, who are still waging an uncompromising fight against tuberculosis of human beings. Many of our European colleagues are astonished by our accomplishment. Many were skeptical when the work began and some said it could not be done.

Since 1917, when the program for the eradication of bovine tuberculosis began, 220 million cattle have been tested with tuberculin. Among this stupendous total approximately 3,750,000 reacted positively to the test and were subsequently slaughtered.<sup>5</sup> Indicative of the success of this

undertaking is the fact that on November 1, 1939, the incidence of tuberculosis in cattle was less than 0.5 per cent in all but six of the 3,073 counties of the United States.

Notable advances have been made in the campaign against bovine tuberculosis and its final eradication or control will constitute the consummation of the most important and stupendous undertaking ever conceived for the betterment of public health. Splendid progress has been made in the two decades the work has been under way and already diminution in the amount of infection among children attributable to the bovine type of the organism is striking. We should be watchful, however, that in the future the importance of the subject is not minimized and ever mindful of the fact that tuberculosis of animals, and particularly of cattle, can be transmitted to human beings. We, therefore, should tolerate no compromise in the measures that may be expected to lead to the ultimate elimination of this insidious disease which is truly preventable.

The suppression of bovine tuberculosis exemplifies, I believe, the admirable results that can be accomplished by close coöperation between the veterinary and medical professions. It is true that the administrative responsibilities and the mechanics of the millions of tuberculin tests that were necessary to achieve these results were entrusted to veterinarians, yet the number of foresighted physicians who assisted in organizing and continuing the attack is legion. As a result of the insistence of the public health physician, most municipalities now require that the milk sold for human consumption be from tuberculin-tested herds, and as a further safeguard most milk also must be pasteurized. As a consequence of this unity of function between the physician and the veterinarian, the United States undoubtedly has the safest milk supply of any nation in the world.

#### RABIES

Rabies, the disease that someone has designated "the most dreaded of all human diseases," has created a situation in the

<sup>5</sup>Wight, A. E.: Personal communication.



United States which constitutes a major challenge to physicians and to veterinarians alike. That an enlightened citizenry should practically eliminate typhoid fever, make notable progress in bringing tuberculosis under control, control smallpox and diphtheria effectively, yet tolerate this menacing threat to human life with apparent complacency is indeed cause for concern. In comparison with many other serious diseases, the total number of animals or human beings affected by rabies is small. However, the entire story can not be visualized from statistics alone. The fear, anxiety, suffering, expense and inconvenience attributable to the presence of this disease are factors inexpressible in precise terms. Death from rabies is a needless and horrible tragedy.

In the control and eventual eradication of no other disease is the coöperation of physicians and veterinarians as important as in rabies. Frequently all the forces of reaction and ignorance are aligned against what should seem, to reasonable-minded persons, logical and proper measures to combat a disease that is more to be feared than the bite of a rattlesnake. Sentimentality, hysteria and just plain "cussedness" frequently unite to frustrate application of the measures necessary to control the problem. The rabies situation in the United States seems to be becoming more acute every year.

There has been considerable controversy concerning certain recommendations advanced for the suppression of rabies and it appears that until the responsibility for eradicating the disease is placed with some national agency, such as the U. S. Bureau of Animal Industry, we can expect no satisfactory solution of the problem. Rabies is fundamentally the responsibility of the veterinary profession and it is important that this fact be recognized if we are to be rid of its menace.

Nature provides exciting variations in the patterns of disease and for the investigator with imagination the search for new facts need never be boring or without compensation. No sooner is one disease fairly well understood and perhaps, like tubercu-

losis of cattle, brought under control than a new entity appears or an old disease that was quiescent suddenly assumes alarming and disastrous aspects that provide the necessary impetus for the reëxamination of old facts and for the search for new ones. Although the occurrence of such a disease may be potentially catastrophic in its effects, when the storm subsides it usually can be said that our sphere of knowledge concerning it has been extended to new frontiers.

#### ENCEPHALOMYELITIS

A recent example of a disease that appeared suddenly and assumed alarming proportions is infectious equine encephalomyelitis. This is by no means a new disease, although the first definitely established American epizootic of horses occurred in California in 1931 when Meyer, Haring and Howitt<sup>6</sup> isolated a filter-passing virus from the brains of two horses that died from the disease. This disease was probably similar to that observed in eastern Colorado and western Kansas and Nebraska as long ago as 1912. In 1933, the disease appeared in epidemic form along the Atlantic seaboard and Ten Broeck and Merrill<sup>7</sup> demonstrated the causative agent to be a filtrable virus immunologically distinct from that which has come to be recognized as the western type of the virus.

The facts established at present indicate that the veterinary profession is confronted by a major problem in animal health that can not be ignored if American agriculture is to be protected against serious loss of its horse population. Important though the disease is as a threat to the horses of the nation, the disease assumed even greater significance when it was established that both the eastern and the western types of the virus were capable of inducing a fatal form of encephalitis among human beings. Credit for suggesting this possibility must

<sup>6</sup>Meyer, K. F., Haring, C. M., and Howitt, B.: The etiology of epizootic encephalomyelitis of horses in the San Joaquin Valley, 1930. *Sci.*, lxxiv (Aug. 28, 1931), pp. 227-228.

<sup>7</sup>Ten Broeck, C., and Merrill, M. H.: A serological difference between eastern and western equine encephalomyelitis virus. *Proc. Soc. Exp. Biol. & Med.*, xxxi (Nov. 1933), pp. 217-220.

go to one of our foremost veterinary pathologists, Karl F. Meyer of California. In 1932, Meyer<sup>8</sup> reported three cases of encephalitis in men who had been closely associated with horses having encephalomyelitis. As a consequence of his study of this material Meyer suggested that in the future the central nervous system of human beings dying of atypical encephalitis should be investigated for the presence of the virus of equine encephalomyelitis. Subsequent observations by others have confirmed Meyer's supposition.

Definite proof that the eastern and the western types of the virus infect human beings often with fatal results was established in 1938. Although the total number of reported cases among human beings to date does not exceed 50 or 60, it is not unlikely that the disease has not been recognized in many cases. The serious character of the infection among human beings provides an additional reason that the disease must be eradicated.

The prevention and control of this disease in horses and in human beings provide an exceptional opportunity for the coöperative action of the veterinary and the medical professions. Although the cause of the disease is known, little information exists as to how it is transmitted and what the natural reservoirs of the virus may be. It seems unlikely that the virus is transmitted from horse to horse or from horse to man by direct contact. It also seems unlikely that the horse is the natural source of the infection. Many species of birds are susceptible to the virus. The eastern type of the virus has been obtained from naturally infected pheasants in Connecticut<sup>9</sup> and New Jersey.<sup>10</sup>

Although it is reasonable to believe that by vaccination the disease can be kept at a minimum in so far as horses are concerned, there is no reason for believing that suppression of the disease in horses will elimi-

nate the hazards to human beings until the natural reservoirs of the virus are discovered and means taken to eliminate the virus at its source. Solution of the problem is more likely to be hastened if it can be attacked by the medical and the veterinary professions working in unity rather than by either working from a detached and independent point of view.

#### OTHER DISEASES

Our vigilant state and federal veterinary services have succeeded in practically eliminating the danger to human beings of many diseases of animals that at one time constituted an ever-present menace to human health. Glanders of horses and mules is an example of a disease the incidence of which has been so reduced by state and federal veterinary agencies that it has become a rarity. Undulant fever is prevented from becoming a major health problem by the splendid veterinary supervision of our milk and meat supply. Also, through the coöperative efforts of veterinarians and physicians sufficient knowledge has been accumulated to enable human beings to escape the consequences of infections such as tularemia, trichinosis and psittacosis or parrot fever. When one realizes that in the United States 60 persons die every hour from a preventable disease,<sup>11</sup> it is a source of satisfaction to know that the veterinary profession has succeeded in removing many hazards to human health that might otherwise provide sources of serious disease.

Although the impression may prevail that the contributions of the veterinary profession to the betterment of public health have been largely from veterinarians engaged in research, this is by no means true. Tribute should be paid the large number of practicing veterinarians who are confronted in their daily routine with problems related to public health. Diseases of animals and conditions of sanitation that are of impor-

<sup>8</sup>Meyer, K. F.: A summary of recent studies on equine encephalomyelitis. *Ann. Int. Med.*, vi (Nov. 1932), pp. 645-654.

<sup>9</sup>Tyzzar, E. E., Sellards, A. W., and Bennett, B. L.: Occurrence in nature of "equine encephalomyelitis" in ring-necked pheasant. *Sci.*, lxxxviii (Nov. 25, 1938), pp. 505-506.

<sup>10</sup>Beaudette, F. R.: Equine encephalomyelitis in avian hosts. *Vet. Med.*, xxxv (Jan. 1940), p. 18.

<sup>11</sup>Ivy, A. C.: Some contributions by animals to human health. *California & West. Med.*, xlix (Oct. 1938), pp. 257-259.

*Note:* A full discussion of the diseases of animals transmissible to man will be found in the following paper:

Barnes, M. E.: Diseases of animals transmissible to man. *Iowa Public Health Bul.*, xlviii (July, Aug. and Sept. 1934), pp. 1-14.

tance to the public welfare unexpectedly present themselves and while the public health officer is concerned eventually, the immediate responsibility is the veterinarian's.

The alertness of the practitioner for danger signals constitutes an important phase of the protection of human health from infectious diseases provided by the veterinary profession. Anthrax, glanders, foot-and-mouth disease, rabies, Weil's disease and mastitis are some of the diseases of concern to public health that are most likely to be recognized first by the practitioner of veterinary medicine. His ability to recognize these conditions promptly and to take the necessary measures for their suppression enables him to discharge his responsibilities in the manner expected by an enlightened citizenry. The rôle of the veterinary practitioner in our program of public health is significant and his contributions should be recognized and appreciated more widely.

As veterinarians we must take cognizance of the fact that gains made in suppressing infectious and parasitic diseases can be maintained and strengthened only by constant vigilance. The veterinarian must be mindful that the agents of disease recognize none of the rules of decent conduct, but are always ready to attack when the circumstances are propitious. The task of controlling disease when once begun must be continued indefinitely. Old diseases may seem to disappear, yet they are only quiescent and new diseases are being recognized constantly. If our watchfulness and diligence is lessened through a false sense of security or indifference, infectious diseases are likely to get out of control, often with disastrous results.

Although the attack on the complex problems of disease is becoming more militant and intensified with each passing year, the final goal, that Utopia where disease has been banished, is probably not possible for man to achieve. Many diseases of an infectious or parasitic nature, however, can be controlled by reducing the possibilities for their transmission and by utilizing the

agents and knowledge that research has provided for their prevention and treatment. To continue the attack and to maintain the objectives gained is an important part of every veterinarian's responsibility. In the conquest of disease the veterinarian has established a record of splendid achievement. In the field of medicine in which he is qualified he has contributed substantially.

The increasing awareness of the general public to matters concerning health emphasizes the opportunities and responsibilities for adequately trained veterinarians who can properly assume their share of the task of making the United States a nation in which bovine tuberculosis will have disappeared, undulant fever ceases to exist and where rabies will no longer cast the tragic shadow of death over the lives of children. America is health-conscious as never before and the opportunities for veterinarians to contribute to the health of the nation are unlimited.

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### The Holstein-Friesian

During the 55 years since it was founded, the Holstein-Friesian Association of America registered 3 million animals, or more than the total number of registered cattle of all other breeds combined. The unregistered Holstein population of the same period runs into much larger figures.

The foundation stock of the Holstein was imported from Holland, where the breed was developed through hundreds of years; however, the total number of importations was less than 10,000, according to the Association's record. The breed is quite American since, in the Netherlands, the typical black and white mappings which decorate so many American landscapes were not preserved by the same careful selective breeding laid down in the rules of this great organization.

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In the light of known facts, positive conclusions as to the rôle of vitamin C in animal production should be made with considerable caution.



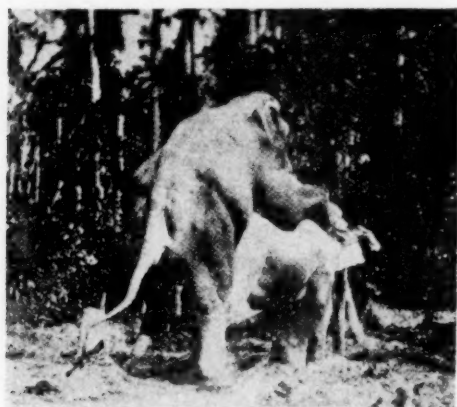
# SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

## Do Elephants Breed in Captivity?

The orthodox belief since ancient times that elephants do not procreate in captivity is obsolete among *connoisseurs* of that species of Elephantidae. Elephants not only breed in captivity but frequently have twins, and calves born of tame mothers in turn give birth to calves.

The erroneous impression that captive elephants do not breed originated from



—Courtesy of the Indian Veterinary Journal

Fig. 1. The climax of copulation.

the fact that they are seldom permitted to mix with one another for the purpose of breeding. After the day's work elephants are tied up and stall fed, and, therefore, mate only on rare occasions. Moreover, there is a certain amount of romance among elephants, a courtship preceding the act of mating, which captive elephants are not granted.

**Coition.**—Another misconception is the belief that the act of coition is performed with the female in the prone, dorsal position. The flappy vulva of the female having about the same ventral location as the male organ of copulation, has led to that

fallacy. Elephants copulate in the same fashion as the other mammalian quadrupeds. There is no maladjustment to be overcome, as figure 1 will prove. Few persons have ever witnessed sexual congress in elephants, except where working ones (tuskers) are permitted to mate. The fallacy about the coital position is, therefore, pardonable. The act lasts from 2 to 15 minutes and is seldom repeated during a short period. One copulation is "more than sufficient."

**Gestation.**—The period varies from 345 to 785 days. Although it is generally believed that pregnancy is longer for female than for male calves, the authors report the birth of a female at 785 days and twins between 599 to 701 days. Twins lie in separate envelopes, one in each horn, and are much smaller than single calves. The average height of a newborn elephant is 35 inches.

Pregnancy is detected toward the end of the term by the contour of the abdomen, by palpating for movements of the fetus, and by development of the mammae. Toward the end of gestation the expectant mother becomes indolent. She is kept at work up to a month or so before parturition.

**Parturition.**—As parturition approaches, the elephant has spells of indigestion and may refuse to go out to graze. The evidence of labor pains is groaning, restlessness, straining, and occasionally getting up and down. The duration of the act was short in the cases described—20 to 30 minutes and expulsion of the afterbirth in 10 minutes. In the case of twins the duration was longer. The presentation was either anterior or posterior. In the latter event the calf is apt to be still-born or mori-



bund. A normally born calf is soon up and nursing. When the navel cord is not torn in delivery, it is detached by the mother with her trunk.

The breeding of elephants is not practiced routinely among the owners of the big timber industry because it does not



—Courtesy of the Indian Veterinary Journal

Fig. 2. Captive mother and her offspring.

pay. It requires 12 years for young elephants to reach working age and in the meantime they are apt to become vicious unless kept at light work.

The authors give graphic descriptions of a number of observations which seem to settle for all time the prevailing misunderstandings about reproduction in elephants. [Sen Gupta, S.C., G.B.V.C., veterinary officer, Port Blair, Andamans and Sen Gupta, S.P., G.V.Sc. *Does the Elephant Procreate in Captivity? The Indian Veterinary Journal*, xvii (1940), pp. 120-132.]

### Castration of a Racing Greyhound

A vicious racing greyhound of great speed having a strong tendency to fight any dog who challenged him was castrated after pondering the effect the operation would have on his speed. Would castration make him lazy?

After receiving  $\frac{1}{2}$  grain of morphine subcutaneously and 6 cc. of nembutal intravenously, the respirations suddenly failed and required five minutes of artificial res-

piration to restore them. In 15 minutes, the respirations and pulse being good, the operation was continued. The testicles were drawn out through the incision by traction and the vascular portion of the cord and vas deferens were ligated with catgut. On recovery from the anesthesia the dog was extremely violent but no damage was done. The sutures were removed in seven days and in two weeks the dog was back in training.

Results: The dog lost his vicious habits but none of his speed. In fact, he equalled a track record in one race. [Potts, J. P. Allen, M.R.C.V.S. *Castration of a Racing Greyhound. The Veterinary Record*, l (Dec. 1940), p. 868.]

### Artificial Insemination of Hens

One rooster or turkey gobbler can fertilize 350 hens during a breeding season of 80 to 90 days, and this number of hens are capable of laying enough eggs to hatch from 5,000 to 6,000 chicks or poults.

Experimental insemination of fowls carried out at the BAI research center at Beltsville, Md., shows that this remarkable performance can be accomplished without much trouble. The advantages mentioned are practically the same as in the farm mammals, namely, (a) extending the service of valuable males, (b) increasing mating efficiency, (c) affording a simple way of fertilizing laying hens that are caged, and (d) improving low-fertility matings.

A cubic centimeter is sufficient to fertilize 50 hens. The insemination is done once a week. The technic of collecting the semen and injecting the ovaries is not contained in the report we have, but can be obtained from the BAI. It is a performance worthy of the veterinarian's attention. We, at least, should not remain uninformed as to its details, whether or not it opens another opportunity to render professional service.

The Medical Center, University of California, is investigating the connection between vitamin B and dental caries.

## The Stader Splint



Use of the Stader splint in a cat, dog, horse and man.

THE STADER SPLINT employed for the mechanical repositioning of fractures has been frequently described in the literature as a contribution to the handling of fractures of the long bones of dogs. But its applicability to the treatment of such fractures in other domestic animals and in the human being is not common knowledge throughout the field of human and veterinary surgery.

The mechanism furnishes a unique method of bringing the ends of fractured bones into perfect apposition and holds

them solidly in place during the formation of the callous without the use of any other means of retention.

The technic consists of connecting steel pins driven into the proximal and distal segments with a vertical adjusting shaft by which the segments can be swung into their normal place and then drawn together.

The inventor, Otto Stader, V.M.D., of Ardmore, Pa., who has assisted in the use of his splint in prominent human hospitals, is shown in the picture (lower left), exhibiting its use on a colt.

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# CLINICAL DATA

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Complete milking is a factor in preventing mastitis in dairy cows.—*Case*.

Overeating in feeder lambs can be prevented by adding three-fourths of a pound of cane molasses daily to their ration.—*Ohio Experiment Station*.

Renewing old attempts to use wood as cattle feed, Norway is going to put 100,000 metric tons of chemical wood pulp to this use.—*Science News Letter*.

In making examinations for *Demodex folliculorum*, do not admit too much light through the condensor as excessive light renders the mite too transparent.—*Milks*.

Vitamin C is found in nearly all fresh aliments, but it resists neither drying nor putrefaction and it is sensitive to the action of heat in the presence of air and alkalies.

Russell and coworkers of Rutgers University announce a spectrophotometric method of determining the vitamin D content of pure solutions which may possibly be applicable to the determination of vitamin D in milk, feeds and other products.

J. A. Cameron, veterinarian for the Chicago Union Stock Yards, says that sulfanilamide has given excellent results in the treatment of pneumonia in horses. Sulfanilamide is practically specific for that serious disease, Dr. Cameron states.

## Firing

Two schools of thought on the benefits of firing in horses are being aired in current issues of *The Veterinary Record*. The only conclusion to draw from the pros and

cons is that this age-old question is by no means obsolescent. It seems, however, that as far as the Thoroughbred is concerned, the advocates of firing "have the edge," as many winners of great events have fired legs.

## Avitaminoses

Avitaminoses of a chronic nature in animals can not be induced in the short time taken in attempts to produce them experimentally. It may require years for the development of avitaminoses that experimenters try to induce in a few weeks. This is especially true of vitamin deficiencies affecting the skeleton (exostoses, perios-toses, arthritis, rheumatism).—*Beltrami, 1938*.

## Float the Teeth

Bulletin 1419 of the USDA advises horse owners to have a veterinarian attend to the teeth of their horses at least once a year. "Older horses, particularly, are often benefited by proper attention to the teeth. . . . If horses do not seem to be making proper use of their feed, the teeth should be immediately checked to see that they are not the cause of the trouble," the bulletin says.

## Cannibalism in Quail

Studies of cannibalism among quail raised in captivity made by the U. S. Bureau of Animal Industry at the Beltsville station showed that the picking habit can be checked by feeding 2 per cent of salt in the ration. As much as 3 to 4 per cent of salt may be added for a day or two in obstinate cases. Even 6 per cent had no harmful effect, although continuing such large doses over a longer period is forbidden.

The use of salt in the ration is also helpful in checking cannibalism in chicks.



### Blood Transfusion Through the Bones

The Society of Experimental Biology (*Science News Letter*, March 8, 1941) reports that blood transfusion can be given through the bones as well as in the veins. Blood injected in the marrow [where blood cells are formed] enters the circulation almost immediately. The method may be useful in infants whose veins are too undeveloped for transfusion or in adults where veins on account of injury are not accessible.

### That Calcium-Phosphorus Ratio

The sound skeleton of horses depends upon the percentage of mineral elements the bones contain and this in turn is dependent to a great extent upon the ratio of calcium to phosphorus in the diet.

A ratio of 1:1.1 is the desirable one according to recent researches. An osteodystrophia develops when the ratio runs to 1:1.8 but does not develop when it is 1:1.4. The cause of skeletal troubles is no doubt the wide variation of the ratio on farms.—*From Vitamin Digest*, January 1941.

### Glauber's Salt in Wound Treatment\*

Sodium sulfate in saturated or nearly saturated solution gives important results in the treatment of seriously infected wounds (*J. C. Lith, The Lancet, Feb. 3, 1940*). The solution is used for prolonged irrigation or for application with well-soaked packs.

Sodium sulfate is not microbicidal, at least not for *Bacterium coli*, since cultures of that organism can be obtained from solutions of this salt. It seems to act through its osmotic power which diminishes cellular and pericellular edema, speeds the course of the lymph, establishes secondary circulation in the capillaries, and favors phagocytosis.

The treatment is particularly resultful in grave muscular lacerations caused by firearms and in crushings where amputation may seem necessary. The decrease of

the swelling and pain, the detergent effect, the diminished discharges and the rapid cicatrization are striking results of this simple local medication of serious injury.

### Intravenous Therapy

Intravenous injections were first used in 1831 for the treatment of Asiatic cholera. An article on the subject was published in *The Lancet* in the volume of 1831-1832. The author, T. Latta, wrote of "copious injection of aqueous and saline infusions into the veins."

The practice was employed irregularly during the succeeding 50 years. The coming of asepsis and improvement in chemistry revived interest in that form of medication.

Intravenous injections overcome (a) delayed entry of the drug into the circulating blood, (b) the disadvantages of bulk in the tissues, (c) the local irritation, (d) changes in digestion, and (e) the difficulty of determining the concentration of the potent drug in the blood. Sulfanilamide is an exception to the latter.

### Sulfathiazole

Sulfathiazole is becoming one of the better known chemotherapeutic agents of the "sulfa" group. Its simplified structural formula is  $C_9H_9O_2N_3S_2$ . In experimental infection it has been shown to possess definite microbicidal properties against pneumococci, meningococci, beta hemolytic streptococci, staphylococci, *Escherichia coli* and the virus of lymphogranuloma venereum. Tests show that it equals sulfapyridine in pneumonia (human) and is quite superior to sulfanilamide in infections produced by *Staphylococcus aureus* and *E. coli*. Its mode of action is probably the same as that of sulfanilamide. That is, it renders the body fluids and other tissues unfavorable to microbic growth.

It appears from reports in medical literature that sulfathiazole may find an important place in the veterinarian's pharmacy, particularly in staphylococcal infections which are quite ambient in animals.

\*Bulletin des Services Zootechniques et des Epizooties de L'Afrique Occidentale Francaise, iii (July 1940), p. 214.



# Convulsions in a Pig Associated with Low Blood Calcium and Phosphorus\*

A. HENRY CRAIGE, JR., V.M.D., and JOHN D. BECK, V.M.D.

Philadelphia, Pa.

CLINICAL observations of human beings and experimental work with laboratory animals have proved that nervous symptoms of a spastic nature are related to low calcium levels in the blood. On the other hand, the literature identifies normal phosphorus levels with these cases, the blood P tending to be high rather than low.

A 10-week-old Berkshire pig suddenly went into convulsions after a week of inappetence; the first seizure lasted several minutes. Upon remission the pig appeared weak and, when helped to its feet, staggered about the pen. Convulsions recurred several times during the following three days, the seizures interspersed with periods of manifest exhaustion. The pig died at the end of this time. Litter mates and other animals in the herd showed no comparable symptoms.

Therapeutic use of calcium seemed to afford temporary protection. Intraperitoneal administration of Ca gluconate in 4-Gm. doses (20 cc. of a 20 per cent solution) was followed promptly by cessation of the convulsions and uninterrupted relaxation for three or four hours. This treatment was repeated on the second day with similar results.

Blood collected before administration of the first dose of Ca gluconate yielded the following:

Total Ca.....	5.1 mg. per 100 cc. serum
Inorganic P.....	2.7 mg. per 100 cc. serum
Total protein.....	5.5 Gm. per 100 cc. serum
Non-protein N....	33.0 mg. per 100 cc. serum

Autopsy revealed nothing of significance; the parathyroid glands were not examined.

When these findings are compared with

the reported normal composition of pig's blood, the non-protein N appears completely normal, while the serum proteins may be regarded as a somewhat low normal level. Both Ca and P, however, are reduced strikingly from the approximate normal minima of 9 and 6 mg. per 100 cc., respectively, assumed for a pig of the age under consideration. It was concluded from these findings, in conjunction with the beneficial effects of Ca administrations, that the symptoms described were associated with hypocalcemia, possibly intensified by hypophosphatemia.

In speculation as to the original cause of this syndrome, it would appear that inappetence must have contributed to the blood deficit; but considering the brief period of anorexia and the severity of the deficit produced, it is difficult to pin the entire responsibility, especially for hypocalcemia, on curtailed intake of Ca and phosphorus. Inadequacy of the ration can be excluded, since the other animals sharing it survived without symptoms of deficiency.

Endocrine dysfunction remains a possible factor in this disturbance. Diminished parathyroid activity is a potent cause of low blood Ca, with a distinct tendency toward rise in phosphorus. If this were a case of idiopathic parathyroid deficiency (and it is possible), then the low P must be explained on another basis. It is conceivable that anorexia of seven-day duration in a rapidly growing pig might result in so much reduction in the blood P level that hypophosphatemia would ensue. This supposition is not entirely in agreement with the general concept of hypoparathyroid symptomatology, but offers at least a theoretical possibility.

\*From the School of Veterinary Medicine, University of Pennsylvania.

## Canine Leptospirosis

TWO STRAINS of *Leptospira* have been described in dogs: *Leptospira icterohemorrhagiae* and *Leptospira canicola*. *L. icterohemorrhagiae* is the more virulent type, the type usually affecting man, and the type found in the rat. *L. canicola* is more common in dogs, occasionally affects man, and does not affect rats.

The mode of infection is direct contact between dogs, contamination of food and surroundings with body excretions, especially urine of infected dogs and rodents, and ingestion of infected rodents.

### SYMPTOMS

The acute form of the disease may be divided into the hemorrhagic type and the icteric type. The hemorrhagic type tends to be the more acute and icterus is not present. The course runs from a few hours to three or four days or longer. The temperature, which may remain normal, usually rises, sometimes to as high as 107° F. A subnormal temperature usually precedes death. Depression is marked and progressive. There is frequent retching and vomiting and the vomitus may contain blood. There may be a diarrhea and the feces may contain blood. Icterus may appear early, but usually appears in the later stages of the disease. A leucocytosis is present.

The chronic form, characterized by nephritis and uremia, is known by other names, such as Stuttgart disease, dog typhus and hemorrhagic gastroenteritis. Dogs with this type show marked depression, stinking ulcerative stomatitis, vomiting, diarrhea and normal or subnormal temperatures. The vomitus and feces may contain blood toward the termination of the disease. The blood non-protein nitrogen and creatinine are high.

### PATHOLOGY

In the acute form icterus and hemorrhage are the principal lesions. Hemorrhages may occur in all organs, particularly in the lungs.

In the chronic form there is an intersti-

tial nephritis, a stinking ulcerative stomatitis, and a catarrhal to a hemorrhagic gastroenteritis. At times there is a calcification of the pleura, the intima of large arteries, and an ulcerative endocarditis with calcification.

### DIAGNOSIS

The agglutination test may be run on the blood serum. In cases with a very rapid course agglutinins are not present. Cultural methods and animal inoculations are used to isolate the organism.

In darkfield examination of blood and urine it is very difficult to differentiate the *Leptospira* from saprophytic spirochetes and pseudospirochetes.

### TREATMENT

Symptomatic treatment is the therapy of choice. Serum has been used to some advantage, but it must be used early in the course of the disease. Vaccines have been used successfully in immunizing dogs against this infection. [Monlux, W. S. *Canine Leptospirosis*. Author's abstract of an unpublished paper read before the Veterinary Medical Association of New York City, December 1940.]

### Lipid Pneumonia

When animals are drenched with an oleaginous material, there is always some danger that a part or all of the drench will flow into the trachea and descend by aspiration into the bronchial tubes and alveoli. Often the accident occurs unnoticed and becomes manifest by accelerated respiration, sometimes accompanied with chill, soon after the drenching.

The seriousness of the accident depends upon the quantity of oil aspirated, and also upon the kind of other drugs the drench contained. Massive aspirations may lead to attacks of coughing and signs of asphyxiation forthwith. If the dose was small, the symptoms are correspondingly less severe. A slight intake of oil into the lungs may not cause any evidence of

trouble until the following days when the symptoms of a bronchopneumonia develop somewhat insidiously. The same accident occurs in cattle, sheep and dogs. In fact, there is some hazard in forcing liquids into any animal.

Oils are respiratory irritants, kind as they are in other tissues. Linseed oil, peanut oil and cod liver oil are particularly irritating to the lungs of animals, independent of the obstruction large doses produce. The accident is never trivial and is one that can be prevented by the careful use of the drenching bottle. Large animals to be drenched should be backed into a stall against the manger in such a way that the head can be raised to a comfortable angle without stretching the neck. Stretching the neck also stretches the muscles of deglutition out of commission and furnishes a straight path to the lungs. The free use of the base of the tongue and pharynx enables the animal to swallow as the presence of the liquid creates the desire. Moreover, painful riggings used to elevate the head turn the patient's mind from the desire to swallow, and so does the struggling of nervous animals. Though the same accident can happen in animals drenched with aqueous mixtures, bland oils are the more dangerous.

Lipid pneumonia in misdrenched, gentle animals is a preventable accident for which a practitioner may be held responsible.

### Black Rot Sweet Potato Poisoning in Cattle

A herd of cattle of which two died the previous morning was called to my attention when two more became afflicted. The symptoms were marked dyspnea, anorexia, and a rise of the temperature to 103° F. No pain was manifested. The autopsies held on the two dead ones revealed changes in the lungs only. They were somewhat inflated and filled with froth but were nowhere consolidated. The rectum was protruded.

Potassium permanganate was given in 20-gr. doses three times during the day. Both died that night. The next day two

more were stricken. They were given a quart of hot lard three times a day. Both of them recovered.

In the two cows that recovered six days elapsed between the time they ate sweet potatoes and the appearance of the illness. In those that died the duration was but four days.

My partner, who has practiced here for many years, has seen this trouble frequently.

CLAYTON STEPHENS, D.V.M.

*Tupelo, Miss.*

[The quantitative factor is always important in reports on injuries from toxic feed. In this case the quantity consumed and the extent of the spoilage are not stated.]

### Chronic Volar Flexion in a Trotting Horse

One of the best-bred trotting horses in the United States, 7 years old, has had "bad legs" since 3 years of age. He trots around 2:10 and paces better than 2:08. When I bought him last fall his tendons were filled and quite sore and he was badly knuckled in both fore legs. The near leg has recovered to a point where a short run at pasture brings it down to about normal but the off one has remained badly knuckled. He trotted in 2:12 last summer.

The aim is to train him as a roadster at horse shows since that does not require as much exertion as racing. What in your opinion would be the outcome of a tenotomy on this horse?—G. H. C., *Illinois*.

[The appearance of this locomotory trouble at the early age of 3 years and the ultimate result after four years of fast work indicate two things: (1) He inherited a texturally weak skeleton and (2) he is of a mighty game sort to stand up as long as he did under the stress of the high speed mentioned. Few horses suffering from that type of leg trouble last that long on the turf. On account of this stamina and the long time it took to entirely disable him for racing, there is a good prospect of recovering sufficiently to serve the purposes of the show ring, which is kinder to legs than race tracks. In prognosticat-



ing the fate of this excellent horse it is reasonable to suppose that the skeletal weakness is not beyond rehabilitation since it stood up so long against tremendous speed.

Advice: Green hay, good oats, coarse bran with some fresh middlings, cod liver oil, carrots, and a well-chosen mineral supplement together with runs at grass and just enough training to keep up muscular strength, may bring these crippled legs almost back to their normal angles. Keeping the feet short at the toe and well shod and applying sensible local irritants of the iodine type to the tendons and fetlocks are not generally omitted in the treatment of chronic volar flexion.

In reply to the direct question about tenotomy, the answer is "Don't," for without the program mapped out above, the flexion will recur. Furthermore, tenotomy permanently blemishes such legs.]

### Phenothiazine Not Losing Ground

This cousin of sulfanilamide is not losing ground as an anthelmintic. As stated in a previous article, it is the only drug besides santonin that is entitled to be termed a specific anthelmintic. The specificity lies in having selective action against worm parasites without a comparable action, local or general, on the host. That time and extensive use will bring forth definite counter-indications is expected, but up to the present time nothing important in that respect has been reported, when the recommended dose was not exceeded. An allergic shock to an old horse suffering simultaneously from strongylosis and pulmonary emphysema (*vide*, J.A.V.M.A., Jan. 1941, p. 37) is the only report of damage from phenothiazine we have received. We also have indirect information to the effect that swine heavily infested with ascarids yield better than formerly reported. Mature ascarids are removed *en masse*. In nodular worms and the common stomach worms of sheep and cattle and strongyles of the horse, no remedy even approaches phenothiazine, and its action against the cecal worm of turkeys is outstanding. It "takes"

from 95 to 100 per cent of these vectors of the blackhead protozoan.

The main disadvantage of phenothiazine is its bulky dose and the somewhat difficult administration as a consequence. Another is the staining of the wool of sheep when carelessly used. Clinical and experimental tests on dogs have been disappointing. Bots of horses and tapeworms of all species resist its action. As in the use of sulfanilamide and others of the group, the anemia produced by large doses is worth watching.

The one danger of importance lies in its too free use by laymen, many of whom, now as in all times, are inclined to handle their worm-parasite problem without any professional advice, and in doing so forget that the vermifuge given is but one step toward solution of the problem.

The Horse and Mule Association of America, under date of March 7, 1941, warns its members about the misuse of phenothiazine, in announcing a catastrophe that befell a rancher whose foreman gave 20 horses (aged 4 to 20 years) 2-oz. doses of phenothiazine on moistened oats immediately after bringing them off the range on account of wet weather. A sequel of this fling into the practice of medicine by the rancher's foreman was 11 dead horses and 9 sick ones which survived the treatment. Cause: the HMAA's teachings that phenothiazine is practically foolproof in horses and mules, granting that this maelstrom was actually a toxic accident. However, judged from the bare facts stated, the cause lacks scientific confirmation. A lot of things can happen to horses under such circumstances, with or without the added hazard of radical medication.

We know of no locale in this country where ranchers do not have access to federal, state or private professional direction when outbreaks of that magnitude come upon their livestock. If veterinarians were consulted in this instance, the announcement cited above is silent about their findings, valuable as a scientific report on the tragedy might have been to the users of this drug in the equine species and all others concerned.

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# EDITORIAL

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## The Social Relations of Science\*

HAVING ALWAYS taken their work for granted, scientists have been content to plod along during the last three centuries without concerning themselves in contemporary affairs. Their gifts to humanity were never seriously doubted. That science could do no harm was uppermost in mind. But, inasmuch as this view has been exterminated, an actual understanding of the relations of science to society has become imperative. The durability of science depends upon such an understanding. During the past 24 years, thinking people have lost much of their pride and their faith in humanity. The security of this civilization greatly depreciated when the World War broke out in 1914. Though American optimism was not significantly changed by that historic event, it is considerably less today than before 1929 when disaster began to show that here too the world is in a bad way.

### CAUSES REMOTE

The causes of the human dissensions which have overtaken the world do not belong to any special event of recent times. The rise of German nationalism began with the defense against Napoleon's dictatorship and later against the British imperialism of the nineteenth century. The root, however, is probably deeper—the defect of the human structure.

Science has recently given the world the radio, the gasoline motor, the airplane, the telephone and other instruments of rapid communication. It has also enabled all people to dress alike and feel alike—equal. One person now feels as good as another. Men and women of all classes look alike on the street. Western clothing worn by prac-

tically all classes gave the Japanese the courage to invade Continental Asia.

Science has made destructive weapons of offense and defense, the one keeping pace with the other, and all of these forces conflict with personal freedom in this stage of technical evolution.

### EIGHTY-THREE SUBJECTS TREATED

The book contains 83 chapters, each one as gripping as the other, all short, concise in text, and manifestly revealing. Experimental science started the advance of knowledge. It began with the prehistoric tools which enabled mankind to make a living and multiply. Tools led to plant and animal breeding. Fruit trees grew from seed scattered about the camp and animals came to depend upon farmers for food, grew tame, and were domesticated.

### ANIMALS THE MOTIVE POWER OF PROGRESS

Here was the magnificent start of civilization. A new store of flesh, once obtained only in uncertain amounts by hunting with crude weapons, came to man's rescue. Then came the loom that transformed animal fibers into garments. The invention of pots for the cooking and storage of food made a profound impression on human life. Families and villages grew up.

The sites of the primitive settlements were the fertile valleys of the Nile and the Euphrates—homes where these early civilizations took form by cultivating, draining, irrigating, breeding, and fertilizing, or moving on when the soil gave out. The discovery of metals—copper—and the harnessing and saddling of animals to replace the human carrier were as fundamental as the great inventions of our time.

The wheel superseded the sledges as early as 3500 B. C. The invention of the wheel

\*A book review with editorial interpolations.

is lost in prehistoric antiquity. Sailing boats, animal domestication and metallurgy came to man later, from 6000 to 3000 B. C. From these developed biology, mechanics, dynamics, chemistry and physics. It was here science began to expand toward its present status. Combined, there is no equal in human achievements to these primitive inventions.

#### MEDICINE IN SCIENCE

In this review we shall pass over mathematics, theology and philosophy to the chapter entitled "Medicine Produces the First Balance of Science." Here, one is reminded again that Greek medicine arose from the sacerdotal and magical practices of the priests. It was the child of tact, fact and fancy modified by the philosophers and by the athletic and military trainers who acquired practical knowledge and experience in the treatment of sprains, wounds and other types of injury which led to skill in manual operations and thence to the rejection of magical medicine.

While medicine has been a great inspiration in the march of science, it is not its chief parent. In some respects, medicine remained scientifically crude [empiric]. It owes much to other branches of science. Greek medicine declined and failed because experimental technic was banned as disreputable. It declined further after the sack of Rome by the Goths. Its downfall can be ascribed to Roman contempt for work. Doctors detested unpleasant duties. They left the sick to the nurses, the making of drugs to the apothecaries, and surgery to the barbers. The false doctrines abolished by Hippocrates and Galen returned. Verbal knowledge took the place of established facts. Doctors stood by and gave orders to the operating slaves, convinced that the knowledge of structure was unimportant. To the Graeco-Roman any manual labor was a disgrace, unbecoming to the behavior of gentlemen. In the hope of being rated as gentlemen, physicians delegated all manual effort to the slaves. In school, slaves dissected the human body (with no more skill than a butcher) while the professors lectured to the students. So, amid the glories of Rome, medicine as an

experimental science sank to a state of impotence. Like all sciences, medicine needed more manual and less rhetorical effort.

#### MOHAMET CONQUERED THROUGH SCIENCE

Mohamet conquered the then known world through science and manual effort—through the rottenness of Rome which had pursued the opposite trend, and he revived science through his people's respect for labor. Likewise, although sometimes signalized as the enemy of science, Christianity was the antithesis of that too common belief. It started with a Master Carpenter asserting the rights of the worker and it created the powerful religious institution under which much of the world now lives—the world of science. Decadent Rome could not resist the invasions of the Arabs, the Huns and the Germans. The latter assimilated the conquered foe, preserved the features of their government, but respected and finally adopted Christianity. As Roman administration disintegrated, the Church took command. But, work and science did not stop. German and Latin sciences were born from the integration. [In veterinary history Islam civilization furnished the connecting link between the animal medicine of Assyria and Judea to the Renaissance.] Benedict (543 A. D.) had brought respectability for labor into Christianity by making the monks honor labor. It was a hard task in the presence of slavery which was to live on through many centuries.

In short, manual effort is the precursor, the ally and the life of science. The two have the same objective in social evolution. Science could not regain its lost ground until manual effort became respectable, because the hand, not words, is its foundation. The wonderful cathedral of Chartres, built at the beginning of the thirteenth century by the local populace who were proud of their brawn and craft, is an outward expression of that fact. Great windows of the cathedral were donated and built by tradesmen, craftsmen, and professionals while the noblemen who detested labor and kept science in abeyance looked on. Islam's science on the one hand, and



Christianity's respect for labor on the other, forged the shape of western civilization and its sciences. Here were the embryos of the modern world.

#### GALILEO

Three chapters tell the story of Galileo, alumnus of Pisa and persecuted professor of Padua. His citation to defend his doctrines at the office of the Inquisition—the government—and his punishment demonstrate what happens to a scientist who ignores politics running wild (the Church was the government). [Professors still lose their jobs when they expound theories which are out of step with the present notions of orderly government.] Galileo was more reprimanded than punished for his precocious teachings. Respect for his knowledge was not wanting. He opened the "Window of the Universe" to the gaze of a world that was unprepared for his teachings and that was disquieted by them. The pendulum, the thermometer, the law of falling bodies, the telescope, and defense of the controversial theories of Copernicus on the revolution of the planets which he taught or invented fulminated ecclesiastical and civil opposition, and led to a retraction of his doctrines. The world of undeveloped science was not prepared to understand the third dimension—the vast depths—of the heavens that his telescope revealed. Sections of this classical book touch upon the accession of trade and manufacture and their effects upon science and politics. The concentration of science and industry gave the world Spain, Germany, France, the British Empire and the Americas. The achievements of scientific societies and industrial laboratories and the way discoveries are made by craftsmen, teachers, amateurs and professional research workers is basal knowledge of the top rank, well told. The history of research in universities through the years from 1540 (at Cambridge) gives a clear insight to the gifts of research to posterity. These are too numerous to name here.

#### SOCIAL BACKGROUNDS

The social background of Germanic, British, French and Scandinavian science dates from the Neolithic Age. Borrowed

freely from southern and eastern sources, it was generously improved in the modern world, particularly in Germany. While Germany was improving her social status by science, England was improving hers by racing and sport, the author points out. To Germany, science was deemed the easy and the right way to acquire social prestige. Having won feudal unity in '71, she proceeded to "major in science and labor" as a means to her ends. Germany was well fitted for progress by the industrious habits of her people as compared with the free and easy ways inherited by the workmen of adjacent countries. But, Germany did not create modern science. She only extended it and it is not now probable that she will develop anything fundamentally new in the science of the future. While Frederick was the parent of this civilization, Hitler is its mortician, judged by the eye of science.

#### MOTIVES IN RESEARCH

Five motives of research workers are pointed out, namely: (1) curiosity, (2) desire for reputation, (3) earning a living, (4) the pleasure of discovery, and (5) altruism.

Man is naturally curious and will go a long way to satisfy that thirst. Although generally loath to so admit, scientists prize reputation highly and zealously guard their claims of priority; they sometimes lose interest in further work when reputation has been won. Newton grew lazy when elected to Parliament. Earning a living is admittedly the object of many scientists. Scientists must eat. The curiosity of the amateur and the inherent desire to help mankind are, however, personal motives of many men in the field of scientific research. [A combination of all five of these motives is probably the better explanation of the characteristic zeal of research workers and inventors.]

#### PLEASANT ANTICIPATION

In the closing pages are chapters entitled "American Foresight," and "The New Interest in the Social Relations of Science." Here, the author unfolds the actual purpose of the book. He stirs the hearts of men

engaged in scientific pursuits, particularly medicine. Medicine, in all times, has been an inspiration to scientists. The nearness of medical men to the motive power of society and the part they play in the world of science and industry is a flattering position to hold in the social whirl.

Crowther's new work is a literary tiara that everyone will enjoy. Made up of 83 short dictations, easy to read, it gives a clear idea of what is going on in this jittery world and, perhaps, it may better prepare one to aid in preventing or modifying the approaching catastrophe. [In his "Outlines of the Universe" the author contended that science is a binder in the structure of civilization. Society may collapse unless the atmosphere of science becomes generally apprehended.] [Please turn to "Book Notices."]

### The Deferment of Veterinary Students From the Selective Service

THE NUMBER of veterinarians that will be needed for a given or prospective military force is a matter to be determined and to be acted upon wisely by the Selective Service Committee, since qualified veterinarians are not made on short notice. In addition to the hazard of removing practitioners and regulatory men from the civilian service, the danger of depleting student bodies has to be considered. Assuredly, the number of veterinarians available for both a large military force and the increased demand for them in civil pursuits due to food procurements by the army, is not now sufficient to provide an adequate disease-fighting and food-inspecting force for the nation.

The AMA has a Committee on Medical Preparedness that is aiding the War Department and the Selective Service Committee to arrive at logical conclusions as to the deferment of medical students in order to allow them to complete their studies. To maintain an adequate medical service in European countries during World War I, students were mustered into the service half trained, and the veterinary schools were closed in order to turn their student bodies over to the remount depots and horse organizations. None of this is

necessary during the present emergency and nothing of the kind should be permitted to occur without protest. It is vital to civilian and military welfare that the five-year preparedness program now started is not turned into the confusion of 1918, when the early coming of an armistice kept our unpreparedness from showing up the evils of military inexperience.

To be remembered is that students entering veterinary colleges now would not be available for service for four or five years and that those now enrolled can add but four to five hundred a year to the army and civilian service.

A summary of developments relating to the veterinary profession in national defense will be found in the news section of this issue.

### False Pedigrees

THERE ARE about 75 associations in this country which register purebred livestock. On the bare facts presented by hundreds of registrants from all walks of life, the officials of these associations vouch for the breeding of animals of various species and breeds running into the thousands. Yet, in view of the large number of pedigrees vouched for and the value each one represents in dollars and cents to the owners, false pedigrees are remarkably few.

While not unaware that registering officials do have their headaches at times and that there are some fake pedigrees, we do believe from longtime observation that the duly registered American pedigree is a dependable document.

The new plan of reducing the incidence of swine tuberculosis by keeping chickens and swine apart on the farm puts an onus squarely up to the farmer himself.

The population of the United States at the end of the 1930s, when the last census was taken, was 131,669,275, a gain of 8,894,229 over the figures for the previous decade. Experts have predicted that the American population will increase until the 1980s and then, perhaps, decline.

## Sir Frederick Grant Banting

(1892-1941)

FREDERICK GRANT BANTING, professor of medical research, University of Toronto, better known as the discoverer of insulin and winner of the Nobel prize (1923) for that contribution to medical science, was killed in an airplane accident at Musgrave Harbor, Newfoundland, February 21, on his way to England.

Although the credit for the discovery of insulin is shared by other workers in the

numerous to name here. He served in the Canadian Army Medical Corps during World War I and was again serving with the rank of major in that corps when he met his untimely death in the line of duty—on the way to the front to report, it is said, certain results of medical research of military significance.

Although Banting's work may seem less important in veterinary medicine, because diabetes mellitus is less common in animals, the insight it has given to utilitarian endocrinology has been far-reaching in all branches of medicine.



Frederick Grant Banting

department of physiology of the University of Toronto, it was Banting who conceived the idea of preparing an extract from the islands of Langerhans while he was connected with the Western University Faculty of Medicine at London, Ont., and it was he the world has honored for directing the researches which led to the understanding of what these tiny islets represent in the biological process of higher life.

Dr. Banting was knighted by the British Empire in 1934, and he received more honors, medals and prizes from scientific societies throughout the world than any other person of this period. These are too

## Sir John M'Fadyean

(1854-1941)

AT THE RIPE old age of 87, Sir John M'Fadyean (Edin. '76) passed away peacefully the first week of February at his home at Hindhead, Surrey, after but three weeks of declining health. The news arrived in the February 8th issue of *The Veterinary Record*, too late to announce in our March issue, where the death of another great European veterinarian, Robert von Ostertag, who passed away a few months before, was signalized. Both of these distinguished figures made veterinary history abundantly through a longer stretch of time than is usually allotted to prominent professional men. Their names were on every tongue through years beyond the memory of most veterinarians living today.

Sir John, according to the Register of Veterinary Surgeons published by the R.C.V.S., was graduated (admitted) April 20, 1876, and thereafter served organized veterinary medicine in Great Britain without cessation in important offices: president, vice-president, councilman and examiner of the Royal College of Veterinary Surgeons; principal of the Royal Veterinary College, London (1894-1927); and president of two International Veterinary Congresses (1914 and 1930). He was



knighted for his work in connection with the Royal Commission on Tuberculosis (1905), which rendered a great service to posterity through studies of the relations between human and bovine tuberculosis.

He is best known among scientists as a pioneer in veterinary-medical research, bacteriology and public health, which he recorded in a classical magazine, the *Journal of Comparative Pathology and Therapeutics*, a periodical he founded in 1888 at the age of 33. These researches, says *The Veterinary Record*, he pursued to the very end, and to this we would add, they will be missed, for he shaped the destiny of his branch of science for the coming generation, more so, perhaps, in America than we are apt to believe.

In the death of Sir John M'Fadyean, Great Britain loses a great son and scholar, and the veterinary profession of the world a friend whose name spelled dignity and knowledge.

#### Docteur Albert Aime Etienne (1870-1941)

A. A. Etienne (Laval '90), native of Quebec and one of the most prominent veterinarians in North America, died at his home in Montreal, February 8, 1941. The news came as a shock to his many friends and host of admirers who knew him as a man who shaped the destiny of the *entourage* in which he labored for more than half a century. After graduating in 1890 he practiced for ten years in Massachusetts and took graduate work at Harvard, but in 1900 he returned to his native country and in a few years (1906) established what was frequently referred to as one of the first *de luxe* animal hospitals on this side of the Atlantic.

His obituary in two languages written by his editorial colleagues of the *Canadian Journal of Comparative Medicine and Veterinary Science* is a tribute written by hearts mourning over a departed confrère and master of his art, that (quoting) "il appliquait suivant les règles d'une science bien comprise. Gai, d'une ironie aimable, plein d'enthousiasme, spirituel, il était toujours prêt à l'attaque et à riposte . . . Ce

n'était ni un tiède, ni un lâche, notre ami Étienne." In English the editor writes: "How can we best speak of Étienne, the friend and professional brother. His was a personality of unusual and happy blend. Youthful enthusiasm was coupled with balanced judgment and force of character. Few men possessed such brilliant wit and his never carried a dagger . . . Loyalty to his profession and his friends was blended into a happy composite which made association with him a memory to be treasured."

Dr. Étienne joined the Association in 1899 and served as resident secretary for the Province of Quebec for more than 20 years. He was vice-president in 1921 and in 1927 and was head of the Committee on Local Arrangements when the annual meeting was held in Montreal in 1923. For the past eight years he occupied the position of president of the College of Veterinary Surgeons, Province of Quebec, which is the highest office within the profession of that part of the Canadian Dominion. On this side of the international boundary we think of Étienne as a man who stood out from the crowd in the veterinary service of his country and who without fanfare won the universal dilection of his colleagues and his countrymen. Adieu, Étienne.

The need of skilled, specially trained technicians can not be overstated. In the last issue of the JOURNAL, page 137, is a brief article thoughtfully supplied by Adolph Eichhorn through reports he received from abroad that shows the tremendous progress made in animal production in Soviet Russia by resorting to artificial insemination. One bull successfully impregnated 98 per cent of all cows, producing 2,620 calves in two years; a ram impregnated 1,500 ewes which yielded 1,800 lambs; and another ram has 12,646 lambs to his credit. In one instance out of 56,000 ewes 98.5 per cent became pregnant. A total of 65 million animals were artificially impregnated during the past ten years in that country. These extraordinary results are attributed to the training of practitioners at a special laboratory in Moscow.

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# WITH THE EDITORS

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## Re: Vet, Veterinary, Veterinarian

The *Newport (Vt.) Express* apologizes for the use of vet, veterinary, etc., in lieu of veterinarian. A reader, evidently irked at the paper's infraction in this particular respect, was courteously reminded that:—

Something veterinarians and the general public do not understand is that veterinarian is a rather long word and headline writers break every rule of grammar, spelling, use of abbreviations, and logic to get short words to convey their meaning. While we sympathize with veterinarians we still believe that they will be called "vets." It may seem wrong, disrespectful and all that but it conveys a definite meaning, long used in three words. And that is something.

Certainly, we like veterinarian best. Vet, like doc, is not a pretty word. Yet, if taken as a public accolade (which it is) instead of an insult (which it is not), some of the convulsions we suffer would be avoided.

Regarding "veterinary": We don't want it used as a substantive. To us it is adjective, only. Here, there is no compromise, although it's noun as well as adjective in Webster *et al*, and also in the Latin languages. Our objection to "veterinary" as a name is reasonable. It is utilitarian, and manifestly so, for a profession to be known by but one name. Multiple cognominations for a definite personnel, like that of the veterinary profession, is proof that a general understanding of its missions is still lacking. And how true that is. If our objectivism does not default in our own circle, the word "veterinarian" will eventually be known by its true meaning: a man duly qualified in veterinary science.

Instead the animal pathologists, livestock sanitarians, meat and/or milk inspectors, horse doctors, etc., who are graduates of veterinary colleges will then be known as veterinarians specializing in divisions of our science. The public is not yet aware that all these are veterinarians by virtue of having been graduated by a dogmatic edu-

cational system. We are glorifying the specialties under a variety of confusing names instead of the parent word—veterinarian—which is too new to the laity and our integration as yet too little understood to expect universal usage. "Veterinarian" came into the English language in 1828 when a journal by that name was started in England. Strangely, however, our English colleagues abolished its use and adopted "veterinary surgeon," a term that has been gradually disappearing in this country since the turn of the century. The fact that our profession is a child of the 20th century, that public attention to its work was meager until recent years, and that we ourselves confused the people with other names, are so many reasons why we should be patient with the newspapers.

Next to the misfortune of being called by wrong names and homely sobriquets would be not to be called anything—to be ignored entirely.

The Association's Committee on Public Relations working through agencies under its sponsorship may be trusted to cure this and other growing pains. But, like any chronic ailment, it takes time and strategy to effect the cure.

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One of the perturbations of the war is the high incidence of foot-and-mouth disease in Europe and the increased vigilance needed to keep it out of this country. Every time we hear of a veterinarian leaving his practice or a state or federal veterinarian leaving his post to go into military training as a buck private we envisage the disruption of a service the people need badly—but they live on unaware of that fact.

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One of the effects of the war is apt to be the fixing of prices of agricultural products according to the will of the victor, meaning chaos for American farming.

# CONSTITUTION, ADMINISTRATIVE BY-LAWS, AND CODE OF ETHICS OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION AS REVISED AND ADOPTED AT THE 77TH ANNUAL MEETING, WASHINGTON, D. C., AUGUST 26-30, 1940

## Constitution

### Article I

*Section 1.*—This association shall be incorporated under the name of American Veterinary Medical Association.

*Section 2.*—It shall be incorporated by the state in which its principal office is located.

*Section 3.*—Its corporate officers hereinafter described shall comply with the laws of the United States governing corporations and of the laws of the state in which the Association is incorporated.

*Section 4.*—It shall forever remain a non-profit organization in fact.

### Article II

#### Objectives

The objectives of the Association shall be:

1) To promote the science and art of veterinary medicine and its related branches;

2) to improve, encourage and support the development of the veterinary service of this civilization;

3) to elevate the standards of veterinary education leading to the degree of Doctor of Veterinary Medicine;

4) to protect the professional and personal interests of duly qualified veterinarians;

5) to procure the enactment of just and appropriate laws and regulations governing the practice of veterinary medicine;

6) to direct public attention to the relationship of animal production and animal health to human welfare;

7) to cooperate with public health services in controlling diseases of domestic animals detrimental to mankind and those diseases that destroy food animals;

8) to publish such literature as may be deemed necessary to accomplish these objectives;

9) to acquire and hold such real and personal property as may be required to carry out the Association's corporate undertakings.

### Article III

#### Membership

The membership of this association shall consist of the following classes:

a) *Corporate Membership.*—The regularly chosen constitutional officers, the members of the Executive Board and House of Representatives, as described and established in the constitution and administrative by-laws, shall constitute the membership of the Association in its corporate capacity.

b) *General Membership.*—The general mem-

bership, otherwise known as the active members, shall consist of graduates of veterinary colleges approved by the Association who have been duly elected in the manner hereinafter provided.

c) *Honorary Membership.*—The honorary membership shall consist of veterinarians or other persons in any part of the world who have risen to prominence in the veterinary profession or who have contributed distinguished service to veterinary science or to the advancement of its application. The election and privileges of such members shall be described in the administrative by-laws.

d) *Junior Membership.*—The junior membership shall consist of members in good standing of the junior chapters chartered by the Association and maintained in accordance with the administrative by-laws.

### Article IV

#### Constituent Associations

*Section 1.*—State, territorial and provincial veterinary associations which have or may hereafter become organized in conformity with the general plan of the American Veterinary Medical Association shall be recognized upon application as constituent or affiliated organizations provided such application is approved by a majority vote of the Executive Board.

*Section 2.*—The term "state association" shall be understood to mean the principal veterinary organization of any state of the Union whose membership is restricted to graduates of recognized veterinary colleges. The term "territorial association" shall apply to such organizations of any of the territorial possessions of the United States, including the District of Columbia. The term "provincial association" applies in the same manner to the provinces of the Dominion of Canada.

*Section 3.*—The term "principal veterinary organization" shall be understood to mean the society having in its membership the largest number of members of the American Veterinary Medical Association.

### Article V

#### Executive Board

*Section 1.*—There shall be a business body known as the Executive Board of the American Veterinary Medical Association which shall have complete charge of the property and the financial affairs of the Association, including the management of all of its publications.

*Section 2.*—The Executive Board shall be



the administrative body of the Association and it shall make reports of its actions to the House of Representatives at each annual meeting.

*Section 3.*—The number of members of the Executive Board, their term of office, the method of choosing them, and the filling of vacancies shall be provided in the administrative by-laws.

*Section 4.*—The Executive Board shall be charged with the appointment of an executive secretary, assistant secretary and/or editor of publications. The tenure, the condition of employment, and the salaries of these employes shall be contained in the report of the Executive Board.

*Section 5.*—Three members of the Executive Board shall constitute the Board of Governors, who shall have charge of the administrative affairs of the Association between the regular meetings of the whole Board. It shall be composed of the president, the president-elect and the chairman of the Executive Board and shall hold meetings at such times and places as the chairman may direct. It shall make an annual report of its actions to the whole Board which shall be included in the records of the actions of the Executive Board.

#### Article VI

##### House of Representatives

*Section 1.*—There shall be a legislative body known as the House of Representatives of the American Veterinary Medical Association, which shall be composed of delegates of state, provincial and/or territorial associations officially designated as constituent societies of the Association, together with delegates of such other groups of veterinarians which the Executive Board with the approval of the House of Representatives shall deem entitled to representation. The number, tenure, voting power, filling of vacancies, authority, and method of election of the members of the House of Representatives shall be described in the administrative by-laws.

*Section 2.*—The House of Representatives shall conduct all business of the Association except that otherwise provided for by the constitution and administrative by-laws.

*Section 3.*—The House of Representatives is, in principle, the voice of the active members. It shall approve or disapprove all matters presented to it by the Executive Board. Its vote, carried out in accordance with customary parliamentary procedure, shall be final. Matters originating in the House, or presented to it by authorized committees, or by any of the regular sections of the Association, shall be submitted to the Executive Board for consideration, and returned to the House for final action.

#### Article VII

##### Officers

*Section 1.*—The officers charged with duties affecting the entire Association shall consist of a president; a president-elect; five vice-presidents, designated for seniority as 1st, 2nd, 3rd, 4th, and 5th; an executive secretary; a treasurer; and an executive board.

*Section 2.*—These officers shall be known as

the corporate officials of the Association and charged with the duty of complying with the laws of the United States governing corporations and of the commonwealth in which the Association is legally chartered to transact business.

*Section 3.*—The eligibility, tenure, duties and method of election shall be described in the administrative by-laws.

#### Article VIII

##### Sessions

*Section 1.*—The words "session" and "meeting," or authorized division thereof, shall be defined as the membership convened in accordance with the provisions set forth in the administrative by-laws.

*Section 2.*—The time, kind, place, number, duration, and purpose of constitutional sessions shall be described in detail in the administrative by-laws.

#### Article IX

##### Amendments

*Section 1.*—The constitution can be amended only by majority vote of both the Executive Board and the House of Representatives, taken at a regular session of the Association one fiscal year after the amendment is first presented. The term "fiscal year" in this section means the time between two consecutive annual sessions.

*Section 2.*—Proposed amendments shall be in writing and read before the Executive Board and House of Representatives during a regular annual session.

*Section 3.*—Amendments favorably acted upon shall be published in the official journal at least 60 days before the annual meeting at which final action is to be taken.

*Section 4.*—Amendments finally adopted under the provisions set forth in this article shall be published within 60 days following their adoption and shall become a part of the printed constitution and administrative by-laws thereafter issued.

*Section 5.*—The publication of amendments as provided in section 3 shall not be abolished.

## Administrative By-Laws

#### Article I

##### Corporate Officers

*Section 1.*—The officers having immediate charge of the Association's affairs in its corporate capacity shall consist of a president; a president-elect; five vice-presidents, designated for seniority as 1st, 2nd, 3rd, 4th, and 5th; an executive secretary; a treasurer; and an executive board. They shall be known as the corporate officers of the Association.

*Section 2.*—The specific method of election, the tenure, the duties and obligations, and replacement of corporate officers shall be described in these administrative by-laws.

*Section 3.*—No member shall be elected as a corporate officer until he has been a member in good standing for at least two years preceding the date of his election; the president-elect for at least five years.

*Section 4.*—Subject to the restrictions herein-

after prescribed, the corporate officers shall have full charge of the management of the Association.

#### Article II

##### The President

*Section 1.*—The president shall be the chief executive officer of the Association.

*Section 2.*—Election (See article III, section 1).

*Section 3.*—Duties:

a) The president shall preside at all general sessions and at all sessions of the House of Representatives but is empowered with the authority to yield the chair to the senior vice-president available for the performance of these duties;

b) he shall deliver an address at the regular annual session on matters pertaining to the advancement of veterinary science;

c) he shall appoint all regular and special committees and shall promptly fill vacancies in the membership of committees created by any cause;

d) he shall serve as a member of the Executive Board *ex-officio* with the same franchise as its other members; he shall be a member of the Board of Governors; and

e) he shall be considered as an *ex-officio* member of all committees with full power to supervise and direct their work. The president shall, however, not be empowered with authority to suppress committee reports, that authority being delegated to the Executive Board and House of Representatives.

*Section 4.*—Tenure: The president's term of office is one presidential year, which shall be defined as the interval between the ends of two consecutive annual sessions. In event of an emergency not provided for in this constitution and administrative by-laws, he shall hold office until a successor has been legally installed. (See article III, section 4.)

#### Article III

##### The President-Elect

*Section 1.*—Election: The president-elect shall be elected by ballot at a regular annual session in accordance with customary parliamentary procedure, or by *viva voce* vote when but one member is nominated for the office.

The nominations for the office of president-elect shall be made on the first day of a regular annual session. When more than one member are nominated, the election shall be held on the day next to the day of nomination, under the supervision of a board of three tellers, appointed by the president, who shall vouch for the eligibility of the voters in regard to membership and standing.

The polls shall be open in the executive secretary's office of the session from 9:00 a. m. to 6:00 p. m. on the day next following the date of nomination. The executive secretary shall furnish a sealed ballot box into which all ballots will be dropped by the voters. The board of tellers shall count the ballots in the presence of such nominees and members of the Executive Board as may desire to be present; and they (the tellers) shall announce the result of the vote at the general session next following the

date of the election. In the case of a protest by one or more nominees made before the general session at which the tellers' report is made, the president is authorized to order a recount of the ballots, to be made by a committee of three—one from the board of tellers, one from the Executive Board and one from the general membership in attendance at the meeting.

These rules governing the election of the president-elect shall be announced to the floor of the general session preceding the election by the executive secretary or his legal representative.

*Section 2.*—Duties. The president-elect shall be a member *ex-officio* of the Executive Board with the same franchise as its other members. He shall be a member of the Board of Governors. (See article V, section 5, of the constitution.)

He shall cooperate in the promotional work of the Association under the direction of the corporate officers, particularly in its relations to constituent associations, other scientific societies and student chapters.

The Committee on Budget shall appropriate a stipulated sum to defray the expenses of the president-elect which are incurred in the line of duty.

*Section 3.*—Tenure: The president-elect shall hold office as such until installed as president. He shall be installed as president at the termination of the annual session next following the one at which he was elected.

The reelection of the president-elect is prohibited.

*Section 4.*—Should the inability of the president-elect prevent his installation into the office of president in the manner prescribed in section 3 of this article, his successor shall be elected in the manner prescribed in section 1 of this article. In this event, the newly elected president-elect shall be installed as president at the end of the annual session at which he is thus elected.

#### Article IV

##### Vice-Presidents

*Section 1.*—Election: The five vice-presidents provided for in section 1, article VII of the constitution shall be elected at each regular annual session immediately following the election of the president-elect and as specified in section 1, article III. The vice-presidents thus elected shall be designated first vice-president, second vice-president, third vice-president, fourth vice-president, and fifth vice-president and shall be rated on a descending scale in the order named according to the number of votes received. When but one nomination is made, vice-presidents may be elected on a *viva voce* vote taken at the time of their nomination. The seniority rating of vice-presidents elected *viva voce* shall conform with the order in which they were nominated.

*Section 2.*—Duties: Vice-presidents shall perform the usual duties of that office customary in parliamentary procedure, that is, they shall function for the president in his absence from the chair, serving in the order of their seniority.

The first vice-president shall become presi-

dent to fill out the unexpired term in the case of death or total disability or resignation of the president. He shall be duly installed into the office of president in any of the aforesaid events by the chairman of the Executive Board.

*Section 3.*—The first vice-president shall be a member of the Committee on Budget.

*Section 4.*—In principle, it is the sense of the Association, although not constitutionally mandatory, to choose the vice-presidents from prominent veterinarians located in widely separated geographic districts.

#### Article V

##### *Executive Secretary and Assistant Executive Secretary*

*Section 1.*—The executive secretary and assistant executive secretary shall be employés of the Association. The executive secretary shall be charged with carrying out the directions of the Board of Governors provided for in section 5, article V of the constitution. The assistant executive secretary shall be responsible to the Board of Governors through the executive secretary.

*Section 2.*—Election: The executive secretary and assistant executive secretary are elected (and may be dismissed for cause) by the Board of Governors (composed of the chairman of the Executive Board, the president and the president-elect) acting for, and under the direction of, the Executive Board.

The report of their election shall be included in the annual report of the Executive Board to the House of Representatives.

*Section 3.*—The executive secretary shall be the general manager of the Association. He shall direct the entire business of the Association, including the clerical work of the Association and of the Executive Board.

*Section 4.*—He may act as editor of the JOURNAL and may, upon approval of the Executive Board, employ such editorial and secretarial assistance as the Executive Board may deem necessary for the conduct of his office.

The executive secretary shall present a written report of his activities and of the Association's affairs at each regular annual session of the Association.

He shall furnish the Executive Board a bond of such amount as said Board may prescribe.

#### Article VI

##### *Treasurer*

*Section 1.*—Election: The treasurer shall be elected by ballot at each regular annual session at the time and in the manner designated in section 1, article III for the election of the president-elect.

*Section 2.*—Duties: The treasurer shall be sole custodian of the cash resources of the Association from whatsoever source obtained. The custodianship shall exclude the revolving fund placed at the disposal of the executive secretary to meet current office expenses, but the treasurer shall hold the executive secretary responsible for the legal disbursement of this fund.

The treasurer shall pay all of the legitimate expenses of the Association, including drafts

for the revolving fund issued by the executive secretary and signed by the president. He shall issue checks against the treasury only on the signed approval of the president and executive secretary, who shall furnish serially numbered vouchers containing full details of the nature of the expenditures. All vouchers and invoices accompanying them shall be filed by the treasurer for a period of not less than five years.

The treasurer shall give a bond to the Executive Board in such amount as the said Board may demand from year to year, and he shall make a detailed report of the financial status of the treasury at each regular annual session or at any other time that the Executive Board may request.

The treasurer shall not be the custodian of the Association's real or personal property but shall receive all incomes derived therefrom, regardless of their source.

*Section 3.*—He shall turn over all funds, property and records to his successor.

*Section 4.*—The repository of the Association's cash resources shall be determined by the Executive Board. For the convenience of making deposits it shall be located in the city where the central office is located. For safety, it shall be a bank of unquestionable financial responsibility.

*Section 5.*—All moneys shall be deposited in the name of the American Veterinary Medical Association.

#### Article VII

##### *Executive Board Chairman*

*Section 1.*—Election: The Executive Board shall elect a chairman annually at the close of its last meeting held during a regular annual session of the Association. He shall be a duly elected member of the Executive Board. He shall be elected by a majority vote of said Board and shall hold office until his successor shall have been installed.

*Section 2.*—The election of the Executive Board chairman shall be announced to the House of Representatives at the last meeting of said House held during a regular annual session.

*Section 3.*—Duties: The chairman shall preside at all meetings of the Executive Board. In his absence from any cause, the Board may elect a temporary chairman.

He shall act as chairman of the Board of Governors, prescribed in section 5, article V of the constitution.

He shall hold in safe keeping the bonds given in trust by the executive secretary, assistant executive secretary and treasurer of the Association.

#### Article VIII

##### *The Executive Board*

*Section 1.*—Number: The Executive Board shall consist of 13 members, as follows: One from each of ten Executive Board districts, hereinafter designated; a member-at-large; the president of the Association (see paragraph d, section 3, article II of these by-laws); and the president-elect (see section 2, article III of these by-laws).

*Section 2.*—Tenure:



a) The ten district members and the member-at-large are elected for five years. The member-at-large is elected at a regular annual session at the time and in the manner described in section 1, article III of these by-laws.

b) The ten district members are elected by mail ballot begun at least four months before the term expires, and in the manner herein-after described.

c) The president and president-elect serve as members of the Executive Board only during their terms of office.

*Section 3.—Election:* Official ballots are sent to all members of the Association of the district in which a member of the Board is to be elected, with the request to nominate the candidate of their choice on the ballot. The ballots are counted at the end of 60 days. The five nominees receiving the highest number of votes are declared the candidates, whereupon a ballot upon which the names of the five candidates are printed is again sent to all of the members of the district with the request to mark an "X" before the name of their favorite candidate. At the end of a second 60 days, the polls are closed and the ballots counted by a committee of tellers selected from the membership by the executive secretary. The candidate receiving a plurality is declared elected and so notified. The result is published in the JOURNAL and a certificate of election is issued to the successful candidate by the executive secretary.

*Section 4.—Duties:*

a) The Executive Board, hereinafter called the Board, shall be the administrative body of the Association.

b) It shall be charged with the duty of carrying out the provisions of the constitution and administrative by-laws.

c) The Board shall read a report of its actions before each meeting of the House of Representatives, which is authorized to exercise all of the powers delegated to the active members in session that are not in conflict with these by-laws.

d) The Board shall pass on the eligibility of all applicants for membership and upon all charges of misconduct filed against members.

e) A summary of the records of the Board shall be published with the proceedings of the Association annually. The Board, however, may withhold from publication any item that may be deemed prejudicial to the best interests of the Association, and shall have full discretion to withhold from publication any manuscript or transcript of the proceedings of the Association.

f) The Board, through the Board of Governors, shall elect an executive secretary annually in the manner prescribed in section 2, article V of these by-laws.

g) On request of a hundred or more members, the Board may submit any question to the active members for their decision by mail ballot.

h) The Board shall have the accounts of all officers having charge of the funds and property of the Association audited by a qualified accountant, annually, or at such other times as it shall direct.

i) Executive Board Districts: There shall be ten Executive Board districts which shall be identified and constituted as follows:

District I: Dominion of Canada.

District II: District of Columbia, Maryland, Pennsylvania, New Jersey, and Delaware.

District III: Indiana, Illinois, and Wisconsin.

District IV: Alabama, Cuba, Florida, Georgia, Kentucky, Mississippi, North Carolina, Puerto Rico, South Carolina, South America, Tennessee, Virginia, West Indies, and West Virginia.

District V: Iowa and Minnesota.

District VI: Arizona, California, Canal Zone and Central America, Colorado, Mexico, Nevada, New Mexico, and Utah.

District VII: Alaska, Hawaii, Idaho, Montana, Nebraska, North Dakota, Oregon, Philippine Islands, South Dakota, Washington, and Wyoming.

District VIII: Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas.

District IX: Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, and Vermont.

District X: Ohio and Michigan.

*Section 5.—*The boundaries of the Executive Board districts may be changed or new districts created when changes in the membership are increased or decreased in any one or group of states or territories to the extent of disturbing the equality of representation that the present apportionment is intended to maintain. The number of members in each district shall be approximately the same.

*Section 6.—*Seven members of the Executive Board shall constitute a quorum for the transaction of business.

## Article IX

### House of Representatives

*Section 1.—*Article VI of the constitution provides for a house of representatives to act for the members in a legislative capacity. This body is hereinafter called the House.

*Section 2.—Number:* There shall be one member for each constituent association or group officially affiliated in accordance with article VI of the constitution. He shall be known as the delegate of his association or group.

a) Each constituent association or official group entitled to a delegate shall choose also an alternate to act in the absence of the delegate.

b) The membership of the House can be enlarged only by the addition of new constituent associations or official groups.

*Section 3.—Election:* Delegates to the House may be chosen either by popular vote of their respective associations or by appointment by the executive officers of said associations. Delegates and alternates are chosen in the same manner.

a) The delegate and alternate representing the Army of the United States shall be chosen by the chief of the veterinary division of the Surgeon General's Office.

b) The delegate and alternate representing the National Association of Bureau of Ani-

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mal Industry Veterinarians shall be elected or appointed by the National Association of Bureau of Animal Industry Veterinarians.

**Section 4.—Tenure:** Members of the House are elected for a term of two years, which shall be considered to mean two consecutive annual sessions of the Association. They shall not serve for the second consecutive term or third consecutive year unless reelected.

a) The members from the following geographical divisions shall be chosen in even-numbered years:

Alabama	Mississippi	Tennessee
Arkansas	Montana	Utah
Colorado	Nevada	Virginia
Delaware	New Jersey	West Virginia
Florida	New York	Wyoming
Idaho	North Dakota	Canal Zone
Indiana	Oklahoma	Philippines
Kansas	Pennsylvania	Alberta
Louisiana	Pr. Edward Is.	Manitoba
Maryland	Saskatchewan	Nova Scotia
Michigan	South Carolina	

b) The members of the following geographical divisions shall be chosen in odd-numbered years:

Alaska	Maine	Oregon
Arizona	Massachusetts	Puerto Rico
British Colum.	Minnesota	Quebec
California	Missouri	Rhode Island
Connecticut	Nebraska	South Dakota
Dist. of Colum.	New Brunswick	Texas
Georgia	New Hampshire	Vermont
Hawaii	New Mexico	Washington
Illinois	North Carolina	Wisconsin
Iowa	Ohio	
Kentucky	Ontario	

c) The members representing the Army of the United States shall be chosen in odd-numbered years.

d) The members representing the National Association of Bureau of Animal Industry Veterinarians shall be chosen in even-numbered years.

**Section 5.—**The voting power of each member of the House shall be regulated by the number of active and corporate members of the Association he represents. Until otherwise determined by action of the Executive Board, the voting power shall be as follows:

50 or less members	1 vote
51 to 150	2 votes
151 to 300	3 votes
301 to 450	4 votes
451 or more	5 votes
Army	2 votes
Nat'l Ass'n BAI Veterinarians	2 votes

a) The voting power shall be determined by the records of the secretary's office 30 days prior to the opening of the annual meeting.

**Section 6.—Duties and Authority:** The House shall perform all of the duties and exercise all of the authority belonging to the membership except the election of the corporate officers. In principle, the House is the "floor" of the annual sessions.

**Section 7.—Credentials:** To qualify as a member of the House the delegate and alternate duly chosen by the constituent association or official group shall file promptly a notice of their election on the special form supplied by the executive secretary.

**Section 8.—**All matters submitted to or originating in the House shall be acted upon and

referred to the Executive Board. If reported favorably or without comment, the action taken by the Executive Board shall be final.

**Section 9.—**In event of an irreconcilable dispute between the House of Representatives and the Executive Board, the president is authorized to form a "joint high commission" composed of two members of the House and two members of the Board, who shall choose a fifth member from the active membership. On questions submitted to it the decisions of the joint high commission shall be final.

**Section 10.—**The annual meeting of the House of Representatives shall be held at the time and place of the annual meeting of the Association.

**Section 11.—**A quorum of the House of Representatives shall consist of 60 per cent of the members of the House registered at the meeting.

### Article X Membership

**Section 1.—**The classes of members provided in the constitution shall be subject to the following regulations.

**Section 2.—**Active members, or the general membership, shall be graduates of colleges of veterinary medicine conducted within the United States and the Dominion of Canada which have been declared accredited by a majority vote of the House of Representatives; or, of foreign veterinary colleges approved by the Committee on Education; or, upon recommendations of the Executive Board, of veterinary colleges which have been closed since 1921.

a) **Election to Active Membership.**—Candidates for membership shall present an application to the executive secretary on a special form approved by the Board of Governors. The form shall state the applicant's race, name, age, education, year of graduating and work in which he is engaged. It shall contain the endorsement of two members, one of whom shall live in the same state, province or territory as the applicant.

b) Notice of all applications shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, year of graduation, post office address, and the names of his endorsers. The applicant shall be declared elected and so notified 30 days after the second notice has been published, provided no objection to his election has been filed in writing. Objections to an applicant's election shall be subject to the action of the Executive Board. A rejected applicant may present his defense to the Executive Board through the House of Representatives.

c) **Educational Requirement.**—Excepting the provisions for admitting graduates of non-existing veterinary colleges, described in article X, section 2, only graduates of accredited colleges shall be deemed eligible for membership. The term "accredited college" shall be defined as a regularly constituted veterinary college or division or department of a recognized university or agricultural institution that maintains

a course of instruction in veterinary medicine extending over four collegiate years of not less than 32 weeks each and of not less than 16 credit hours per week, and which maintains a matriculation requirement of not less than four years of standard high school work and at least one year of college work leading to a baccalaureate degree, commonly designated as a pre-medical year. However, accredited colleges may, without prejudice, accept matriculants who, in the absence of the above-named credentials, pass satisfactory examinations before officers of the public educational system approved by the dean.

**Section 3.—Dropping Members, Journal Subscriptions, Membership Fee, Dues, Reinstatements:**

a) Members who have not paid dues for the current year, which ends December 31, shall be dropped from the membership but may be restored to the membership list during the following year by paying the debt owed, provided no charge of other misconduct has been filed against them.

b) Members who have not paid their annual dues on April 1 of the current year shall be dropped from the subscription list of the JOURNAL, in compliance with postal regulations governing the mailing of second-class matter.

c) Dues shall be \$5.00 a year, payable in advance on January 1 of each year. The dues include payment for the subscription to the JOURNAL and other documents distributed to the membership, such as directories and convention programs.

d) **Membership Fee and Dues.**—The membership fee shall be \$5.00, and the dues, which include subscription to the JOURNAL, shall be \$5.00. Both are payable in advance at the time the application is filed. But, in order that the dues and subscription shall run from January 1 of each year, the following amounts shall be remitted with each application:

January .....	\$10.00	July .....	\$7.50
February .....	9.58	August .....	7.08
March .....	9.16	September .....	6.67
April .....	8.75	October .....	6.25
May .....	8.33	November .....	5.83
June .....	7.91	December .....	5.42

e) **Dismissals.**—Violation of the code of ethics, conviction of a felony by a court of law, and activities prejudicial to the welfare of the veterinary profession shall constitute ground for dismissal from the membership. The charges shall be filed with the executive secretary in writing and copies of them shall be furnished to the defendant together with a notification to appear before the Executive Board at a stated time and place. In lieu of a personal appearance or appearance by counsel, a written defense shall be acceptable. The publication of charges or transcript of the trial resulting therefrom shall not be published in the JOURNAL unless specifically ordered by a majority vote of the Executive Board.

f) **Reinstatements.**—Members dropped for non-payment of dues may be reinstated by paying their indebtedness to the Association, or by reapplying for membership as provided in section 2 of article X. A member dismissed

for cause under paragraph e, section 3, article X, may reapply for membership on the unanimous consent of the Executive Board.

g) The JOURNAL shall be mailed only to members in accordance with section 3, paragraph 6 of this article and by subscription to reputable research laboratories, libraries and schools; individuals and other institutions desiring the JOURNAL must be vouched for by the constituent association of the respective state.

**Section 4.—Junior Members:** A student of an accredited veterinary college which maintains a junior chapter of the American Veterinary Medical Association may become a junior member by maintaining membership in his local chapter. If reported in good standing by the officers of his chapter, he shall be issued a membership card and such other tokens as the Association may issue from time to time. Junior members are entitled to all of the privileges of active members at the annual session except the right of franchise and shall be furnished an official badge without the payment of the registration fee.

**Section 5.**—Distinguished scientists, qualified in accordance with paragraph "c," article III of the constitution, may be elected honorary members in such numbers as the Executive Board may permit. The names of proposed honorary members shall be announced at the first session of the House of Representatives at an annual meeting and they shall be voted upon at the last session of the same meeting. Except for holding office and voting privileges, honorary members shall have the same rights as active members. It is the sense of the Association, hereby declared, that but one or two honorary members shall be elected at the same annual meeting.

a) Junior members recommended as being in good standing in their respective junior chapters for three years may be admitted to membership without the payment of the membership fee of \$5.00, provided the application is filed and completed within 30 days after the date of their graduation.

## Article XI

### Constitutional Sessions

**Section 1.**—a) **Time:** An annual session shall be held between July 1 and December 31 of each calendar year. The exact date shall be fixed by the Executive Board at least four months prior to the time decided upon.

b) **Place:** The United States and the Dominion of Canada shall be divided into four convention zones for the holding of annual sessions in such numerical order as to favor alike all sections within the contiguous territory of these two countries. The selection of the place of holding the annual session shall be governed by the following rotation during the years named and during succeeding years, or until this clause is legally amended:

1940.....	Zone 2	1944.....	Zone 3
1941.....	Zone 1	1945.....	Zone 1
1942.....	Zone 4	1946.....	Zone 2
1943.....	Zone 1	1947.....	Zone 1

The boundaries of the convention zones are shown in the official map herewith reproduced.





### APPORTIONMENT OF AREAS FOR AVMA CONVENTIONS

Every other year, beginning with 1941, the annual meeting of the Association will be held in area 1. The conventions of the even-numbered years will be held in areas 4, 3, and 2, respectively. Thus, the 1942 meeting will be held in area 4; 1944, area 3; 1946, area 2.

c) **Invitations:** Invitations for annual sessions shall be filed with the executive secretary not less than two years and four months prior to the date of the session concerned and they shall be presented to the House of Representatives for action two inter-convention years before the meeting is to be held. The city in which the annual session shall be held shall be decided by vote of the House of Representatives.

d) Duration: The duration of annual sessions shall be fixed by the Executive Board.

**Section 2.—Quorum:** Twenty-five per cent of the number of members registered at an annual session shall constitute a quorum for the transaction of business at a general session.

**Section 3.—Order of Business:** The order of business shall be as follows:

- a) Call to order by the presiding officer;
- b) call of the enrollment;
- c) presentation of minutes;
- d) annual address of the president;
- e) presentation of the presidential key to the president-elect;
- f) presentation of awards;
- g) nomination of officers;
- h) presentation of the official scroll to the outgoing president; and
- i) adjournment.

**Section 4.**—No special meeting of the general membership shall be held for the transaction of business except on petition of a majority of the constituent associations, when an unusual

emergency arises. Such meetings and their purpose shall be announced to the entire membership through the JOURNAL, or otherwise, at least 30 days prior to the date fixed for the meeting. Business not thus announced shall not be transacted at a special meeting.

*Section 5.*—All sessions, including the section meetings, shall be ruled under customary parliamentary usage, as set down in approved "rules of order."

## Article XII

### Committees—Standing and Special

*Section 1.*—The president shall appoint the following standing committees for such time and purpose as hereinafter described:

## 1. COMMITTEE ON BUDGET

a) *Personnel*.—The Committee on Budget shall consist of the president, first vice-president, executive secretary, treasurer, and the chairman of the Executive Board.

b) *Duty*.—Its members shall study the financial affairs of the Association, propose means of increasing the income and provide plans for reducing expenses. It shall set the amount to be appropriated for the officers, committees and special projects legally undertaken by the Association.

c) The executive secretary shall publish the report of the Committee with the business proceedings of the annual session.

d) *Reports*.—The Committee shall report its actions to the Executive Board for consideration and presentation to the House of Representatives.

e) The Committee shall make definite appropriations for the principal expenses of the Association as follows: (1) rentals, (2) salaries of employes, (3) printing, engravings, paper and postage for the JOURNAL, (4) traveling expenses of the officers, (5) expenses of committees, and (6) special appropriations approved by the House of Representatives.

#### 2. COMMITTEE ON EDUCATION

a) *Personnel*.—This committee shall consist of five members appointed by the president at the rate of one member per year, each to serve for a term of five years. Not less than three members of this committee shall be members of the teaching staffs of veterinary colleges accredited by the Association but no two members shall be of the same faculty or graduates of the same veterinary college.

b) *Duty*.—It shall make an annual report on the status and needs of veterinary education as conducted in the existing veterinary colleges; on the relation of veterinary education to animal production; and on the number of qualified veterinarians required to maintain a competent veterinary service for the American people. When deemed necessary, the committee is authorized to inspect veterinary colleges and submit annually a list of such colleges as should be accredited by the Association.

#### 3. COMMITTEE ON LEGISLATION

a) *Personnel*.—This committee shall consist of five members, four of whom are appointed by the president for a term of five years at the rate of one per year and the executive secretary, who shall act as chairman.

b) *Duty*.—The Committee on Legislation is delegated to watch for subversive legislation in national, state and municipal legislative bodies that is detrimental to the progress of veterinary medicine and to enlighten such bodies on the enactment of constructive measures of interest to veterinary science and the production of domestic animals.

#### 4. COMMITTEE ON PROGRAM

a) *Personnel*.—This committee shall consist of the secretaries of the regular sections and the executive secretary, who shall act as chairman.

b) *Duty*.—It shall compile the program of the annual session, procure suitable contributors and titles for the programs of the respective sections, submit a report of the progress of its work to the chairman in sufficient time to avoid duplications and thereby insure a broad coverage of the field of veterinary medicine.

c) All reporters shall be instructed to register their names and titles with the chairman at least four months before the annual session.

d) The Committee on Program is responsible for all technical exhibits, educational exhibits, demonstrations and clinics in cooperation with the Committee on Local Arrangements. It shall provide reporters and all necessary material required in the presentation of contributions.

#### 5. COMMITTEE ON PUBLIC RELATIONS

a) *Personnel*.—This committee shall be composed of five members appointed by the president for five years at the rate of one per year. The president shall appoint the chairman.

b) *Duty*.—The Committee on Public Relations shall take over the former duties of the Committee on Policy, which is hereby discontinued. Its duties shall be that of studying the relations of the veterinary service to other branches of science and industry and carrying out educational programs beneficial to the general welfare of mankind through the medium of the scientific and public press, civic clubs, professional groups and radio.

#### 6. COMMITTEE ON VETERINARY BIOLOGICAL PRODUCTS

a) *Personnel*.—This committee shall consist of five members, one of whom shall be appointed annually by the president for a term of five years. The first membership shall be appointed for one, two, three, four, and five years, respectively, for terms expiring in the same order. The Committee shall have members as follows: (1) one connected with commercial production or marketing of biological products, (2) one employe of the U. S. Bureau of Animal Industry, (3) one conducting biological research not commercial, (4) one general practitioner, and (5) one state regulatory officer.

b) *Duties*.—It shall be the duty of the Committee to study the prophylactic and therapeutic merits of the various biological products employed in the practice of veterinary medicine and to present a report of its findings at each annual meeting.

#### 7. COMMITTEE ON PROPRIETARY PHARMACEUTICALS

a) *Personnel*.—This committee shall consist of five members, the majority of whom shall be actively engaged either in teaching or research work on pharmacology and/or therapeutics; one member shall be a general practitioner and one a small animal practitioner. The terms of office shall be five years. The president shall appoint members at the rate of one per year. The president shall appoint the chairman. The executive secretary or assistant executive secretary shall be a member *ex-officio*.

b) *Duty*.—The functions of this committee are to study the merits of proprietary pharmaceutical preparations employed in the practice of veterinary medicine; to cooperate with the Food and Drug Administration of the United States Department of Agriculture and the Federal Trade Commission in removing undesirable products from the drug and food market; to cooperate with similar groups in the medical profession engaged in the same activities; and to submit a report of its work at each annual session.

#### 8. COMMITTEE ON RESOLUTIONS

a) *Personnel*.—This committee shall consist of seven members appointed by the president for a term of one year. The president shall designate the member who shall serve as chairman. The executive secretary shall be *ex-officio* secretary of this committee. He shall receive,

file and publish resolutions presented throughout the year and submit them to the House of Representatives at the next annual meeting.

b) *Duty*.—To frame, receive and present resolutions for the good of the Association shall be the duty of this committee.

#### *Special Committees*

*Section 1.*—The president shall be empowered to appoint committees delegated to perform special duties. Their term of office shall be one year. The duties, members and chairmanship of special committees shall be designated to the House of Representatives in the announcement of their appointment.

#### *Article XIII*

##### *Amendments*

*Section 1.*—The administrative by-laws may be amended at any annual session by the same procedure as that provided for amending the constitution.

*Section 2.*—Excepting the sections affecting the corporate officers provided in the constitution, any part of the administrative by-laws may be temporarily suspended by a two-thirds vote of the House of Representatives.

*Section 3.*—Excepting sections affecting the corporate officers provided in the constitution, the administrative by-laws may be permanently amended at any annual session by submitting, in writing, notice thereof to all the membership 90 days prior to the annual session at which final action is to be taken. Publication of proposed amendments in three consecutive issues of the JOURNAL shall be regarded as due notification to the members.

#### *Article XIV*

##### *Sections*

*Section 1.*—The Association shall be divided into the following sections:

- a) General Practice,
- b) Surgery and Obstetrics,
- c) Research,
- d) Small Animals,
- e) Sanitary Science and Food Hygiene, and
- f) Poultry.

*Section 2.*—The officers of each section shall consist of a chairman and a secretary.

a) The officers of the sections shall be chosen by the president from section members nominated by ballot by each section or, in lieu of such nomination, by direct appointment.

*Section 3.*—The group of sections officially approved shall be known as "The Scientific Council." The membership of The Scientific Council shall consist of the chairmen and secretaries of sections.

a) The Scientific Council shall be charged with the duty of planning the program of the different sections and arranging the material presented in such a way as to avoid duplications. It shall select reporters and titles and endeavor to cover the progress made in the branches of science each section represents.

#### *Article XV*

##### *Registration*

*Section 1.*—The executive secretary shall provide ample facilities for registration and the

collection of the registration fee at the regular meetings.

*Section 2.*—The amount of the registration shall be fixed annually by the Executive Board. The fund collected for registration shall be used in defraying the expenses of the Committee on Local Arrangements.

*Section 3.*—The executive secretary shall issue badges to the members, ladies, guests, visitors and exhibitors entitled to receive them. No person shall be admitted to meetings or any part of the proceedings until he has registered and been furnished with the official badge.

#### *Article XVI*

##### *Property*

*Section 1.*—The executive secretary shall be the custodian of all the real and personal property of the Association.

a) A list of all personal property, such as deeds, securities, leases, insurance policies, charters, furniture and fixtures, machinery and apparatus, books, and other movable articles, shall be kept available for inspection.

b) A list of the Association's property and its approximate value shall be included in the annual report of the executive secretary.

#### *Article XVII*

##### *Publications*

*Section 1.*—The Board of Governors is authorized to publish a monthly periodical which shall be known as the Journal of the American Veterinary Medical Association, and such other printed material as may be deemed advisable in conducting the affairs of the Association.

*Section 2.*—With the consent of the Board of Governors, the executive secretary or other employé may be designated as the editor of the JOURNAL.

*Section 3.*—The Board of Governors, formerly known as the Committee on JOURNAL, shall serve in the capacity of a managing editor.

*Section 4.*—Members specializing in the various branches of veterinary medicine may be appointed associate editors.

#### *Article XVIII*

##### *Local Secretaries*

*Section 1.*—The president shall appoint for each calendar year a secretary for each state of the United States, each province of the Dominion of Canada, and for foreign countries designated by the Executive Board.

a) *Tenure.*—The term of office shall be one year.

b) *Duties.*—The duties of the state and provincial secretaries are to promote the interests of the Association within their jurisdiction by 1) cooperating with the secretaries and other officers of constituent associations; 2) participating in the work of local organizations; 3) furnishing technical, professional, and personal news to the executive secretary; and 4) assisting in or initiating plans for the obtention of new members. The local secretary may recommend the appointment of "assistant local secretaries" to aid him in stated districts within his jurisdiction.

c) Local secretaries in foreign countries shall be known as "foreign correspondents."



# Code of Ethics

## Preamble

The honor and dignity of our profession lies in our obedience to a just and reasonable code of ethics set forth as a guide to the members. The object of this code, however, is more far-reaching, for exemplary professional conduct not only upholds honor and dignity, but also enlarges our sphere of usefulness, exalts our social standards and promotes the science we cultivate. Briefly stated, our code of ethics is the foundation of our individual and collective efforts. It is based upon the Golden Rule.

## General Department

**Paragraph 1.**—Conduct characterizing the personal behavior of a gentleman is expected of all members of the profession.

**Paragraph 2.**—It is the solemn duty of all members of the Association to deport themselves in accordance with the spirit of this code.

**Paragraph 3.**—This code is not intended to cover the entire field of veterinary medical ethics. Professional life is too complex to classify into a set of rules one's duties and obligations to his clients, colleagues and fellow citizens.

## Professional Department

**Paragraph 4.**—No member shall use a college degree to which he is not entitled or any degree or title granted by an institution declared unworthy by contemporary institutions of its class.

**Paragraph 5.**—No member shall belittle or injure the professional standing of another member of the profession or unnecessarily condemn the character of his professional acts.

**Paragraph 6.**—Members shall comply with the common law governing their obligations to their clients and shall obey without obvious fault the official public regulations and laws governing their acts.

**Paragraph 7.**—Consultations:

a) When a fellow practitioner or laboratory worker or officially employed veterinarian is called into consultation by the attending veterinarian, findings and discussions with the client shall be handled in such a manner as to avoid criticism of the attending veterinarian by his client.

b) When in the course of his authorized official duty it is necessary for a veterinarian to render service in the field of another veterinarian, it will be considered unethical to offer free or compensated service or advice other than that which comes strictly within the scope of his official duty.

c) Consultations should be conducted in such a spirit of professional coöperation between consultant and attendant veterinarian as to assure the client's confidence in veterinary medicine.

d) Consultants shall not revisit the patient or client or communicate directly with the client without the knowledge of the attendant veterinarian.

e) Laboratory workers in the rôle of consultants shall deport themselves in the same manner as fellow practitioners, whether they are private, commercial or public functionaries.

f) In no instance and under no circumstance shall a consultant take charge of a case or problem without the consent of all concerned, particularly when the client's financial obligations to the attendant veterinarian have not been adjusted.

## Advertising in General

**Paragraph 8.**—Advertising as a means of obtaining patronage is objectionable in the practice of any branch of medicine. It is denounced as unethical and unprofessional. Veterinary medicine is not an exception. On the contrary, on account of its widely misunderstood objectives, it is the branch of medical practice that is most vulnerable to fair and unfair criticism from other scientific pursuits.

**Paragraph 9.**—Objectionable advertising consists of:

a) Advertising personal superiority over one's colleagues.

b) Advertising secret remedies or exclusive methods.

c) Advertising fixed fees for given services.

d) Advertising as a corporation or partnership beyond that which would be ethical for either party.

e) Advertising case reports, allegedly unintentional.

f) Advertising hospital and office equipment and the special service rendered therewith.

g) Advertising the building or occupation of a new hospital as an unsolicited news item of the local press may be considered unavoidable and unobjectionable. Solicited and repeated publicity of this class is, however, frowned upon by the Association.

## Directory Advertisements

**Paragraph 10.**—Advertising in a city, commercial, telephone or any widely circulated directory is a violation of this code.

**Paragraph 11.**—A member who permits his name to be listed in directories in bold-face type or who advertises his name or hospital or institution in any way differing from the standard style, type or size used in the directory for the listing of professional groups (physicians, dentists, lawyers, nurses) is subject to the charge of unprofessional conduct.

**Paragraph 12.**—It is also unethical for a veterinarian to allow his name to be printed in public directories as a specialist in the treatment of any disease or in the performance of any service within the scope of veterinary practice.

**Paragraph 13.**—In principle, this section of the code of ethics is intended to improve the listing of names in such a way as to give all of them identical visual prominence.

## Advertising in Local Newspapers

**Paragraph 14.**—It is customary and advisable

in certain communities to print advertisements of professional men in local newspapers. But, such advertisements should be reasonable in size and display. They should be limited to name, title, address, office hours and telephone number.

**Paragraph 15.**—Members are encouraged to write articles for the local press announcing the presence of contagious diseases and their seasonal prevention or treatment, provided the motive is a bona fide attempt to salvage the livestock of clients rather than personal gain. Wisely worded articles of this type add to the dignity and usefulness of the veterinary profession, whereas paid advertisements of the same subject are manifestly detrimental and, therefore, are violations of this code.

#### Advertising by Mail

**Paragraph 16.**—The distribution of cards or circulars by mail or otherwise reminding clients that the time is at hand for rendering certain services (vaccinations, worm-parasite treatment, etc.) is a questionable practice that should be frowned upon as objectionable advertising.

**Paragraph 17.**—Bona fide personal letters or telephone calls of the same class as printed material may, however, be approved under special circumstances of grave emergencies, where professional dignity is not sacrificed.

#### Advertising by Personal Cards and Letterheads

**Paragraph 18.**—The letterhead of a professional man should be modest, announcing only name, title, address, telephone number and office hours.

**Paragraph 19.**—In view of the turn veterinary practice has taken in recent years, a veterinarian may announce on his cards and letterheads that his practice is limited to the treatment of diseases of small animals or poultry, provided that such cards or letterheads indicate that he is a member of the veterinary profession and thus distinguish him from groups of irregular practitioners who are not eligible to membership in the Association.

**Paragraph 20.**—The mailing of letters or cards announcing a new location of office, hospital or other place of business is permissible. But such occasions should not be used as an excuse for violating the code in other instances.

#### Advertising by Display Signs

**Paragraph 21.**—Display signs of reasonable size and dimensions on veterinary hospitals are not regarded as objectionable, provided they do not announce special services, such as bathing, plucking, clipping and x-ray work, which characterize the ways of the charlatan.

#### Emergency Service

**Paragraph 22.**—When called in an emergency as a substitute for a fellow practitioner in his absence, it is the veterinarian's duty to render the necessary service and then turn the patient over to his colleague upon his return.

**Paragraph 23.**—In making emergency calls

upon a patient already under treatment, it is unethical to institute radical changes in the treatment previously prescribed in such a way as to attract unusual attention.

#### Testimonials—Guarantees—Frauds

**Paragraph 24.**—Members of the Association shall not write testimonials as to the virtue of proprietary remedies or foods except to report the results of properly controlled experiments or clinical studies, such reports to be given publicly through a veterinary journal or at a meeting of a veterinary association.

**Paragraph 25.**—It is unethical to guarantee a cure.

**Paragraph 26.**—Members of the Association shall avoid the impropriety of employing questionable methods to attract public attention or boast of possessing superior knowledge or skill in the treatment or prevention of any disease.

**Paragraph 27.**—The issuing of false certificates of health on official documents is punishable by summary dismissal from the membership, and careless compliance with official regulations that the veterinarian is intrusted to enforce is deemed a violation of professional honesty.

**Paragraph 28.**—When employed by the buyer to inspect an animal for soundness, it is unethical to accept a fee from the seller. The acceptance of such a fee is *prima facie* evidence of fraud. On the other hand, it is deemed unethical to criticize unfairly an animal about to be sold. The veterinarian's duty in this connection is to be a just and honest referee.

#### Illegal Practice

**Paragraph 29.**—It is unprofessional to aid in illegal practices of others.

**Paragraph 30.**—Members of the Association shall not indulge in illegal practices, such as practicing without procuring a license or teaching others to do so in violation of the laws governing the practice of veterinary medicine.

**Paragraph 31.**—It is the duty of members of the Association to report illegal practices to the proper authorities and to report such practices by members of the Association to the Executive Board.

#### Use of Association's Endorsement

**Paragraph 32.**—No member or employé of the American Veterinary Medical Association shall use the name of the Association in connection with the promotion or advertising of any commercial product or commercial service, or in any way that would imply American Veterinary Medical Association endorsement of such a product or service without written permission from the Board of Governors or the Executive Board.

#### Loyalty

**Paragraph 33.**—The veterinarian should first of all be a good citizen and a leader in movements to advance community welfare. He should commit no act that will reflect unfavorably upon the worthiness of his profession.

# CURRENT LITERATURE

## ABSTRACTS

### A Modified Whiteside Test for Chronic Bovine Mastitis

A modification of the Whiteside test for the detection of chronic bovine mastitis has been developed in which various degrees of reaction can be recognized. The modified test is performed by mixing five drops of fore milk and one drop of N. NaOH solution on a flat glass plate. A dull green blotter is used as a background. Mixing is effected by stirring with a glass rod. The reaction occurs during stirring and takes the form of a precipitate or a viscid mass. Six grades of reaction are recognized: negative, slight, 1+, 2+, 3+, and 4+. In order to be classed as negative, a sample of milk should be entirely free of precipitate. A 4+ reaction is characterized by the formation of a thick, viscid mass that does not readily break up. Reactions between negative and 4+ are classed according to the amount and character of the precipitate.

The modified Whiteside test was applied to 298 macroscopically normal samples of aseptically drawn fore milk from separate udder quarters of 76 cows. One hundred eighty-six of the samples were bacteriologically negative; of these, 5.9 per cent yielded a Whiteside reaction of 1+ or higher, 7 per cent contained 500,000 or more leucocytes and 10.7 per cent had a pH above 6.8. Eighty-seven samples contained more than 200 staphylococci per cubic centimeter; of these, 50.6 per cent yielded a Whiteside reaction of 1+ or higher, 60.9 per cent contained 500,000 or more leucocytes, and 24.1 per cent had a pH above 6.8. Twenty-five samples contained streptococci; of these, 72 per cent yielded a Whiteside reaction of 1+ or higher, 80 per cent contained 500,000 or more leucocytes, and 28 per cent had a pH above 6.8. All samples of

milk thus far encountered that gave a 4+ Whiteside reaction showed macroscopic abnormality before the test was applied. [Murphy, James M., and Hanson, John J. *A Modified Whiteside Test for the Detection of Chronic Bovine Mastitis. The Cornell Veterinarian*, xxxi (1941), pp. 47-55.]

J. M. M.

### Nicotinic Acid Synthesized in Sheep

Lambs maintained on a nicotinic acid-deficient basal diet for a period of approximately 8 months were found to yield significant quantities of nicotinic acid in their urine, the quantity being of a magnitude similar to that in lambs receiving nicotinic acid supplements in their diet. It appeared that synthesis of this substance occurs in the body of the sheep. [Winegar, A. H., Pearson, P. B., and Schmidt, H. *The Synthesis of Nicotinic Acid in the Body of Sheep. Science*, xci (1940), pp. 508-509. *Abst., E. S. R.*, Oct. 1940, p. 532.]

H. J. M.

### A Sneezing Disease of Swine

The affection described is a rhinitis characterized by sneezing and purulent nasal discharge. All ages may be affected, but young suckling pigs are most commonly seen in the acute stages. In badly infected herds the mortality among the young pigs is high. Some die before the clinical signs appear. The young pigs that survive the acute stage develop atrophy of the turbinates with resultant deformity of the snout. This gives rise to the picture of so-called "bull nose." Healthy pregnant sows placed in an infected yard developed sneezing disease and their litters also became infected. Attempts to isolate a causative agent gave negative results. The authors



think that the acute rhinitis is a virus disease and the dystrophy of the turbinates develops secondarily. [Thunberg, Ernst, and Carlström, Birger. *Om nyssjuka hos svin från epizootisynpunkt. Skand. Vet-Tidsk.*, xxx (1940), pp. 711-723.]

A. G. K.

### Sterilization of Surgical Instruments by Di-ethylene Glycol

Di-ethylene glycol, instead of water, is recommended for small electrical sterilizers because using it avoids the mineral deposits and stains on the instruments and to a large extent the dulling of the edges of cutting tools. It boils at 250° C. and fumes markedly at this temperature. If a small electrical sterilizer is set at "low" the temperature of the liquid rises to about 150° C. Adequate sterilization can be obtained at a temperature where fuming is not apparent. Since di-ethylene glycol is completely soluble in water, it may be promptly removed from instruments by dipping them in sterile water. This compound evaporates very slowly on standing. It is relatively inexpensive and can be obtained from chemical supply houses. [Gurchot, Charles, and Mellars, Newton D. *Sterilization of Surgical Instruments by Di-ethylene Glycol. Science*, xciii (1940), p. 516.]

H. J. M.

### Feline Pellagra

A description is given of the symptoms of a nutritional deficiency in cats which are relieved following a daily oral dose of 80 to 100 mg. of nicotinic acid. Each of six cats studied had lost weight and refused food. They appeared weak, sluggish and usually the head hung much lower than the rest of the body. They made no effort to move when poked and offered no resistance to hyperextension of the mouth. The oral cavity presented a peculiar yet typical appearance, characterized by an ulcerated, reddish margin in the upper part of the palate close to the midline, and the tongue was very red over the terminal portion.

Saliva of an extremely foul odor drooled from the mouth. Each animal showed a temperature 3 to 5 degrees above normal. Within 48 hours following the administration of nicotinic acid, the appetite returned, the symptoms subsided, the temperature returned to normal and the oral lesions disappeared.

Diets previous to the onset of symptoms are not given. [Heath, M. K., MacQueen, J. W., and Spies, T. D. *Feline Pellagra. Science*, xciii (1940), p. 514.]

H. J. M.

### Human and Equine Encephalomyelitis in Saskatchewan

While Fothergill and coworkers of Harvard University and Webster and Wright of The Rockefeller Institute for Medical Research were investigating the Massachusetts outbreak involving 46 human cases of equine encephalomyelitis in 1938, an epidemic similar in many respects was taking place in the southern part of Saskatchewan—in the region of Regina and Weyburn—where members of the medical profession were puzzled by the appearance of an epidemic form of encephalitis closely resembling that which occurred in St. Louis in 1933.

The cases were naturally suspected of being associated with the equine epizootic and the fact was subsequently established by J. S. Fulton, head of the Animal Disease Laboratory of the University of Saskatchewan. While most of the cases occurred on farms around Weyburn and Regina, the disease appeared as far south as Estevan, west to Swift Current and north as far as Saskatoon. The total number of cases was 29, of which 13 were males and 16 females. The youngest was 2 months old and the oldest, 72 years. The first case appeared July 20 and the last one September 12. The peak of the epidemic was reached August 15 to 25. As to severity, 14 were classified as severe, 10 as moderate and 5 as mild. There were 4 deaths, 18 complete recoveries and 7 incomplete recoveries, and in no case was more than one sick in the same family.

*Symptoms.*—In most cases the onset was sudden, the temperature high (105° F.),

with pains, aches and a feeling of malaise, and mental sluggishness. Often headache is excruciating. When the back aches the body is held "stiff as a poker." To these symptoms may be added (for some cases) neck rigidity, nystagmus, dysphagia, anorexia, vertigo, muscular twitchings, vomiting, nausea, abdominal cramps, convulsions, constipation and, rarely, diarrhea. On account of the high temperature, delirium and leucopenia, it may be mistaken for typhoid fever, and some have described it as an attack of influenza. Acute poliomyelitis and tuberculous meningitis must be considered, also the season and the knowledge that an epidemic exists.

The average duration is about 3 weeks. The mortality (for this epidemic) was 12 per cent.\* One of the fatal cases was a child of 3 months; the other three were adult males, 21, 23 and 35 years of age. [Gareau, Urban, M.D. *Clinical Aspects of an Epidemic of Human Encephalomyelitis. Canadian Public Health Journal*, xxxii (Jan. 1941), pp. 1-5.]

### Yeast in the Treatment of Trichostrongylosis in Calves

The author fed yeast to calves which, because of a heavy trichostrongyle infestation and the feeding of a low grade of roughage, were so debilitated that they were unable to stand and were not eating. It was not considered safe to administer an anthelmintic. After each calf was given a suspension of 0.5 lb. of dried yeast in 2 qt. of water through a stomach tube, they would eat some of the yeast which had been soaked for a few minutes. The amount fed was increased until they were getting 1 lb. per day. Grain (a fitting ration), leafy alfalfa and carrots were fed in gradually increasing amounts. On the 16th day and again on the 25th after the start of the treatment, they were given 30 cc. of a 50-50 mixture of tetrachlorethylene and mineral oil after their mouths were swabbed with a 5 per cent copper sulfate solution. The yeast feeding was continued for 60 days, when the calves were consid-

ered completely recovered. The author attributes the condition of these calves partly to the low quality of hay fed, and probably to a lack of vitamins B and G. [Baker, Donald W. *Yeast as an Adjunct to the Anthelmintic Treatment of Advanced Cases of Trichostrongylosis in Calves. The Cornell Veterinarian*, xxxi (1941), pp. 13-16.]

H. J. M.

### Riboflavin Deficiency in the Dog

A basal ration composed of purified casein, sucrose, cod liver oil, and salt mixture was found to be adequate for growing dogs when supplemented with thiamin, nicotinic acid, vitamin B<sub>6</sub>, riboflavin-free liver extract, and riboflavin. When riboflavin was omitted from the diet, a characteristic acute deficiency syndrome was produced in from six to eight weeks. If administered sufficiently early in the development of this syndrome, the riboflavin supplement exerted a marked curative effect. [Axelrod, A. E., Lipton, M. A., and Elvehjem, C. A. *The Production of Uncomplicated Riboflavin Deficiency in the Dog. American Journal of Physiology*, cxxviii (1940), pp. 703-708. *Abst., E. S. R.*, Oct. 1940, p. 531.]

H. J. M.

### Profits in Pet Foods

The editorial and advertising office of "Super-Market Advertising" publishes the first of a series of articles on the merchandising of food for pets, telling the story of the dog from remote antiquity to the present gigantic development of the dog-food industry. The dog population is given as between 15 millions and 20 millions, which opens up a vast outlet for dog foods. The article points out that while dogs may relish food of fine flavor, its nutritive value may not be adequate. As this large population of dogs can no longer forage for itself, it must depend for nourishment upon foods similar to those eaten by the human being and at the time humans eat. The three kinds of dog food on the market are described, namely: (1) packaged food, (2) biscuits and (3) ground dry foods. An outline is given of the essential components

\*The mortality of the Massachusetts outbreak was given as 70 per cent.

as regards proteins, carbohydrates, fats, minerals, vitamins and hormones, in such a way as to give the user a clear idea of what a food for dogs should contain.

The extensive research laboratories and kennels set up by some of the better dog-food manufacturers indicate the importance of developing formulas based upon the present-day knowledge that has come out of world-wide studies. Many of these have been so carefully conducted that the whole field of nutrition has been greatly enriched, as well as that of the millions of dogs the people now own and admire. [*Pet Foods in Super Markets. Advance Copy. March 1941.*]

### Avian Tuberculosis

This is essentially a literature review. It is pointed out that, except for China, avian tuberculosis is world wide in distribution. The United States has the highest incidence of the disease; in some states 80 per cent of the chicken flocks are infected. In Sweden, during the years 1920 to 1939, inclusive, 13,878 chickens were examined, of which 5.9 per cent had tuberculous lesions. In the southern provinces, the incidence was 12 to 16 per cent. A small number of other fowls, including wild birds, were found to be infected.

In fowls the primary lesion is in the intestinal tract and is usually in the form of a subserous caseous nodule or an ulceration of the mucosa. Lesions in the ovary are uncommon, and eggs from tuberculous fowls rarely contain tubercle bacilli. When the bacilli are found in the yolk, they probably have had a hematogenous origin. Those present in the white portion may have come from tuberculous salpingitis or peritonitis with extension to the oviduct.

With the exception of rabbits, the common laboratory animals, including dogs and cats, are resistant to avian tubercle bacilli. Infection in cattle has been reported from various countries. The primary lesion in the bovine species appears to involve the mesenteric lymph nodes. Of the heterologous hosts, swine are most frequently found to be infected with avian tubercle bacilli.

In table form is given the percentage of avian infection in tuberculous swine examined in various countries. Of 249 tuberculous swine examined in the United States, 90.4 per cent had the avian type of infection. In Sweden, 27.6 per cent of 352 tuberculous swine were infected with avian tubercle bacilli. Man may become infected by eating the flesh of tuberculous fowls with bacillemia, by eating infected eggs, or perhaps by drinking milk of infected cows. However, there are very few authentic cases of avian tubercle bacillus infection in man. [*Hillmark, K. Om fågeltuberkulos, dess frekvens och roll som smittkälla. Skand. Vet.-Tidsk., xxx (1940), pp. 918-931.*]

A. G. K.

### BOOK NOTICES

[*Social Relations of Science. By J. G. Crowther. Cloth. Pp. 665. Price \$3.50. The Macmillan Company, New York, Boston, Dallas, Chicago, San Francisco, Atlanta. Please turn to editorial section for the review.*]

### Diseases Transmitted from Animals To Man

The second edition of this book, like the first edition published in 1930, contains graphic descriptions of the microbic diseases to which the human being is exposed through his contacts with domestic animals and wildlife. Unconscious of what transpires from day to day in medical research and experience, one is struck with the vast amount of new material such a revision must contain to bring it up to date after the short period of eleven years since the first edition was published.

This book is a piece of classical veterinary-medical literature, known for the authenticity of its text. It is an exposé by famous authors, chosen for their knowledge and for their work on the given diseases as they afflict the animal and the human being, edited by a prominent figure of the American Medical Association. Mohler on



tuberculosis, Huddleson on brucellosis, Kelser on rabies, Meyer on psittacosis with interpolations of famous veterinarians of the past and present throughout the chapters, is proof that here is a book containing noteworthy details on problems of each day in the practice of veterinary medicine.

Contrary to the orthodox monographs on the subject by veterinarians which have appeared in our literature since the days of Louis Pasteur, this treatise tells to what extent and in what manner this group of microbic diseases afflict the human being and gives a wealth of statistical records which bring human and veterinary medicine into a partnership that has been lacking in the labors of the two professions during the modern era of medicine.

One must not judge this book by the essays of the past written from the strictly veterinary point of view, but as a documentation combining the views of medical science as a whole. In other words, "Diseases Transmitted from Animals to Man" is a true comparative pathology of the diseases described: epidemiology, epizootology, prophylaxis, diagnosis, semiology (in man and animals), geographic distribution, statistics, and history. Seemingly, nothing of importance the physician or veterinarian should understand about handling these diseases is omitted.

The last section, entitled "A Review of the Rôle Played by Each Animal in the Spread of Disease," is a masterpiece on the progress of man from "cave-shelter to pent house" as it was affected by his animal companions. Here we are told that animals "have sent to death untold millions of people and have saved from death other millions," to which we would agree but for the fact that there would not have been any "untold millions" to kill or to save had domestic animals not existed through the centuries to permit their biped masters to multiply, to build nations, to acquire wealth and to enjoy the comfort and security that only domestic animals can furnish. [*Diseases Transmitted from Animals to Man*. By Thomas G. Hull, Ph.D., director of the Scientific Exhibit, American Medical Association, and 14 co-authors. Price \$5.50.

Pp. 403. Cloth. Charles C. Thomas, Springfield, Ill. 1941.]

### Training the Dog

A writer on dog training qualified to such a degree that a sixth edition of his book on that subject has to be published to supply demands must have something on the ball—some kind of philosophy that sounds the right chord. Certainly, teaching such a complex art as training all sorts of dogs requires a keen understanding of canine mentality as well as faith in training as a means of improving the dog's usefulness to mankind.

It is more than mere chatter to warn dogdom that man's future attitude toward dogs will depend to a considerable extent upon training—upon the kind of obedience and general behavior that increases the dog's popularity. The author's remark that dogs should be trained to such a point "that the presence of dogs among us does not offend those who do not like dogs" is logic of the higher order. That wisdom applies to all animals. It is the training of them that transforms man's abhorrence of animals, and dogs in particular, to a feeling of respect and admiration. Moreover, one is constrained to compliment Captain Judy for the frank way he tells the world that permitting dogs to roam when and where they please and bite whomsoever they please is something to correct. Here is wisdom of the *n*th degree for which Judy's output of canine literature is noted. Better that we have fewer dogs and more well-trained ones, for, amplify to the heart's content the sentimentality attached to the dog because of his nearness to his master, the fact still remains that like other groups of domestic animals, the dog belongs in his own proper domicile and should be trained not only to stay there but also to behave right therein, instead of running half wild when and where he pleases and thus jeopardizing the popularity of the whole world of dogs. Training in that sense is training indeed which Judy's sixth edition does not fail to emphasize.

Rightly, of course, the book dotes on psychology, for the training of an animal is a

psychogenic art. There is a mind rather than a body to train. But he who treks into the science of comparative psychology may be and generally is lured into a manifestly idealistic study. The great canyon separating human and animal intelligence is not so easy to fathom. Man can teach parrots to squawk and dogs to whimper, but to classify these vocal expressions with human verbalism is pretty panegyric. The I. Q. of the human being and that of his animal companions are not that close. So, the author's belief that "it may be possible to develop speech in the dog" is quite optimistic, quite imaginary, in view of the dogmatism of animal psychology. Anyhow, veterinary science has not abandoned the Platonic theory of the soul to that extent, notwithstanding the examples cited as proof that talking dogs are just around the corner. Our field is too pragmatic to bother with the unknowns of mental physiology, justifiable as it may be to point out the mental development of animal prodigies in popular literature. Although knowledge and instinct do blend with one another, veterinary science is not yet audacious enough to draw a line between them for practical use. However, in attempting to do so, *Training the Dog* gives as good an insight to the blending of knowledge and instinct as is possible to do in the light of present-day ken. Philosophy and science are not unrelated.

The chapters on actual training we leave for the expert to judge. The addendum is delightful reading. Six "case studies" are used to clinch the doctrines of the "psychological chapters" and the closing pages, entitled Standard for Obedience Test Trials, lay down the rules for that new departure in dog-show exhibits. The book has values beyond the connotation of its title. [*Training the Dog*. By Will Judy, editor of *Dog World Magazine*. Cloth. 160 pages. Illustrated with comic cartoons. Price \$1.50. Judy Publishing Company, Chicago, 1941.]

### Report of the Ontario Veterinary College

The letter of transmittal from Principal McGilvray of the Ontario Veterinary Col-

lege to the Minister of Agriculture of the Province of Ontario for the year 1939 shows that the number of students enrolled in that institution was 291, that the requirements for admission and graduation were raised to regulate the attendance, and that special courses were given to graduate veterinarians on (a) public health work, (b) fur farming and (c) clinical veterinary medicine covering questions of current importance: urinalysis, encephalomyelitis, brucellosis, swine disease, parasitic diseases, *et al.*

Special research and investigations were made on equine influenza, encephalomyelitis, overdosing pigs with reduced iron, the prevailing swine diseases (cholera, erysipelas, enteritis, plague, bacterin anaphylaxis, stiff lamb disease).

The clinics available for the instruction of students comprised horses, cattle, sheep, swine, dogs, cats, poultry and fur-bearing animals. The biological laboratory furnished the practitioners of Ontario 96,000 doses of pullorum antigen and 17,000 doses of bovine brucellosis antigen, and 25,519 blood tests were made for them. The results of the latter are given as follows:

Number tested .....	25,519
Positive .....	3,802
Negative .....	19,899
Unfit for testing.....	331

The college staff made 240 tests of milk samples submitted from time to time. These concerned butterfat, plate count, coliform, methylene blue, resazurin, reductase and phosphatase tests. The laboratory made 863 pathological and microbic examinations. Interest in poultry diseases was greater than in previous years. The increased demand of poultrymen for veterinary service included research and extension work. The number of poultry cases investigated was 2,657.

"A high standard of efficiency has been maintained throughout and all expenditures have been carefully supervised and kept at a minimum cost to the Province," Principal McGilvray states in this graphic annual report of the oldest veterinary college in North America.

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# THE NEWS

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## AVMA Activities

### Veterinarians in National Defense: The Status of Senate Bill 783

At the time of going to press, the fate of the Murray Bill (see editorial in March JOURNAL, pp. 236-238) is unknown. This bill, it will be recalled, would amend the Selective Service Act of 1940 with respect to the induction of graduate physicians and dentists, medical and dental hospital internes, and medical and dental students. Immediate cognizance was taken by President Wight of the omission of graduate veterinarians and veterinary students from the provisions of the bill and appropriate action was taken to call this to the attention of the sponsor of the bill and also the Senate Committee on Military Affairs, to whom it was referred after introduction on February 6.

During the latter part of February and early March, appropriate communications were addressed to Senator Murray and the members of the Senate Committee on Military Affairs by the officers of the AVMA and by practically every state veterinary association, several local associations, the deans of veterinary schools and many others, setting forth the numerous valid reasons why the veterinary profession should be included in Senate Bill 783, and urging that it be suitably amended. As a result of these activities, assurances were received that every consideration would be given to graduate veterinarians and veterinary students when the bill came to hearing.

So much interest has been manifested in this matter by our members and so many inquiries regarding it have been received in the central office that recent developments are herewith summarized.

A hearing on the Murray Bill was held by a sub-committee of the Senate Committee on Military Affairs on March 18, 19 and 20, at which time representatives of the American Medical, the American Dental and the American Veterinary Medical associations were present and were heard. President Wight was in attendance throughout the entire hearing, and was called on to testify. Additional valuable information was presented by H. W. Schoening, chief of the Pathological Division of the U. S. Bureau of Animal Industry, in the absence of the Bureau chief, John R. Mohler. Moreover, the claims of the veterinary profession for recognition in the bill were most ably seconded

by Morris Fishbein, editor of *The Journal of the American Medical Association*, who appeared for that organization, and by representatives of the Medical Corps and the Dental Corps of the U. S. Army. Great assistance had already been rendered in behalf of the veterinary profession by Colonel R. A. Kelser, chief of the Army Veterinary Corps; by Congressman George W. Gillie, veterinary member of the House of Representatives from Indiana and a member of the AVMA Committee on Legislation; by Mark Welsh, chairman of the AVMA Committee on Public Relations and secretary-treasurer of the United States Live Stock Sanitary Association, and others.

The War Department and the Selective Service officials have consistently, and for understandable reasons, opposed legislation such as is contained in S. 783. Representatives of these governmental agencies also testified at the hearing and the gist of their opposition is summed up in the statement of one who expressed fear that adoption of the bill in question would lead to a procession of groups seeking similar deferment for individuals from many different walks of life.

At the conclusion of the hearing representatives of the various interested professional associations were invited to submit written statements supporting their claims. Following will be found the statement submitted by President Wight in behalf of the AVMA and the veterinary profession.

In conclusion, and to be properly realistic, it should be stated that the chances for favorable consideration of the bill, in the face of official opposition, are not roseate. However, there are good reasons to believe that, if the bill is reported favorably, graduate veterinarians and veterinary students will be included in its provisions.

Inasmuch as it has been impossible to acknowledge individually the many communications received, the Association's officers take this opportunity of expressing their gratitude for the valuable assistance so promptly rendered by many members in presenting the facts of the situation to officials in Washington. The membership will be kept fully informed of future developments.



### Statement in Support of the Inclusion of Graduate Veterinarians and Veterinary Students in Senate Bill 783

The American Veterinary Medical Association is deeply interested in national defense and pledges its full support to it. We believe, however, that there are sufficient reasons that graduate veterinarians and veterinary students should be included in Senate Bill 783, together with the provisions in the Bill applying to the medical and dental professions. Among these reasons are the following:

1) The need for assuring and protecting ample supplies of meat and dairy products, and other foods of animal origin, which are essential to the nutritional well-being of the civilian population and our military forces.

Today, fortunately, the United States has ample resources of animal food products. Our livestock industry is the largest and the healthiest of any nation. This is due to well-organized and administered veterinary agencies, both public and private, which have functioned to exclude or control animal-disease plagues that have hampered other nations.

The agencies that have made possible the unparalleled record of the United States in animal production and in the safeguarding of animal food products include (a) private practitioners of veterinary medicine who serve as the first point of contact and the first line of defense in the recognition and control of communicable diseases of animals; (b) the veterinary personnel of the federal Bureau of Animal Industry; (c) the veterinary personnel of the state livestock sanitary authorities; (d) veterinarians employed by state and municipal departments of health for meat and milk inspection; and (e) the Veterinary Corps of the Army, one of whose responsibilities is the inspection and safeguarding of most of the important food products used by our armed forces.

It is a practical certainty that, for some time to come, the livestock industry of this country will be called upon to supply not only the greatly increased needs of our military establishment for all kinds of animal food products and the extra needs of a civilian population geared to a huge expansion of industry for national defense, but also large amounts of meat and dairy products for export. It would be a catastrophe to court the famine and pestilence here which have so commonly swept other countries during conflicts of lesser proportions than the one which is now almost world wide.

The introduction and spread of a serious animal plague such as foot-and-mouth disease in this country, which is always a threat to be guarded against, could quickly disorganize and almost destroy the foundation of our essential food supplies. Our veterinary agencies are

the protection against such disasters. Without adequate, well-trained veterinary agencies, both public and private, the threat to our national economy and national security is not simply an idle conjecture, but a stark probability based on realism.

It may be pointed out that the final break-up of the Central Powers in the last World War came about not so much through need of actual munitions of war as through the morale-devastating lack, approaching famine, of foods, particularly those of animal origin, for both the civilian and military forces. We submit that the strength of this nation's military establishment and the other measures for national defense will be no greater than the health and nutritional well-being of all our people; that ample supplies of food products from healthy animal sources are vital to the defense program; and that a properly husbanded and directed veterinary profession is fundamental to the whole problem.

2) The second great need is for a steady, uninterrupted influx of properly educated and highly trained veterinary graduates to supply the replacement needs of our veterinary forces, public and private. The veterinary personnel of the United States is relatively small, comprising some 10,000 graduate veterinarians in all fields of work. There are graduated each year from the approved schools and colleges of this country only about 500 newly-qualified veterinarians. This number even in normal times is barely sufficient to supply needed replacements due to deaths, retirement and other causes.

From five to six years or longer are now required to complete the training in veterinary medicine. Any interruption of the education of the present classes of veterinary students would inevitably lead to an acute shortage of properly qualified veterinarians within a short period. This shortage would be felt in every field of veterinary activity, the federal and state bureaus of animal industry, the Veterinary Corps of the Army and so on throughout all ranks of the profession.

The compelling reason for including veterinary students in the provisions of Senate Bill 783 is evident. These young men are badly needed to complete their training as pointed out, yet they are the very ones most liable, from an age and physical-fitness standpoint, to selection under the Selective Service and Training Act of 1940. Should the entire group be taken, it would mean the procurement of only about 2,000 effectives over the whole country.

We respectfully submit that no policy of the Selective Service Administration which would lead to the procurement of such a relatively small number of effectives for training would be defensible in the face of an almost certain breakdown of essential veterinary services due to lack of properly educated and trained re-

placements for the profession.

Many reasons for the inclusion of graduate veterinarians and veterinary students might be elaborated upon, if time permitted. However, even brief summary of them should bring recognition of the vital importance of maintaining fully adequate veterinary services throughout this period of national emergency:

The necessity for conservation of animal resources (cattle, horses, sheep, swine, poultry) and their products (meat, milk, butter, cheese, eggs, hides, wool, glandular extracts, gelatin and many others).

The vital importance of adequate veterinary supervision over the health of animals as a public health measure.

The need for effective meat- and milk-inspection services by qualified personnel, in which the veterinary profession is outstanding.

The preparation of biological products, such as antitoxins and vaccines, that are indispensable to the public health and especially needed for the protection and immunization of our armed forces.

The absolute necessity of guarding this country against the introduction and spread of animal-disease plagues which might seriously threaten our whole livestock industry and the very base of our food supplies.

In conclusion, it may be stated that wise planning now will safeguard against the possibility of future disaster. The American Veterinary Medical Association urges the passage of Senate Bill 783, amended to include graduate veterinarians and veterinary students, only to insure the utilization of qualified professional personnel to serve the nation's needs to the best possible advantage.

Our Association greatly appreciates the opportunity to present the above material to the members of the Senate Committee on Military Affairs and we trust that the request to have graduate veterinarians and veterinary students included in Senate Bill 783 may receive favorable consideration.

Respectfully submitted,

(Signed) A. E. WIGHT, *President*.

March 22, 1941.

### Executive Board Nominations Opened in Districts VI and VIII

Ballots were sent on March 5 to members in District VI (Arizona, California, Canal Zone and Central America, Colorado, Mexico, Nevada, New Mexico and Utah) and District VIII (Arkansas, Kansas, Louisiana, Missouri, Oklahoma and Texas) for the nomination of candidates to succeed the present members of the Executive Board whose terms expire at the close of the annual meeting in Indianapolis, August 11-15.

Members who have not returned their ballots are reminded that the nominating polls will close May 5. After the votes are counted, elec-

tion ballots will be prepared listing the five highest men in the districts concerned, and mailed about May 15.

### Committee on Local Arrangements Meets

The Committee on Local Arrangements for the Association's 78th annual session convened at the Severin Hotel in Indianapolis, Sunday, March 29.

### New Strides Made in Dog-Food-Testing Program; Grocery Magazine Publishes Series on Pet Foods

Reports that interest in the testing program of the AAHA and the AVMA is increasing rapidly have come in to the Committee on Foods of the former during the past month from dog-food manufacturers, dog owners, veterinarians and a widely circulated grocery trade publication.

Another large dog-food manufacturer with national distribution has signed with the Committee on Foods to have his food tested for the seal of approval. Other manufacturers from all parts of the country have asked for information which may result in several more foods being placed on test. Conferences are being held almost daily with these manufacturers, who seem to be greatly interested in promoting and bettering dog foods. It is becoming increasingly apparent that the seal of approval is recognized as a symbol of purity and quality.

*Super Market Merchandising*, one of the better-known grocery trade publications, has prepared a series of articles on the general subject of merchandising pet foods. The articles are informative and are written in an attempt to educate grocery clerks so that they may properly advise dog owners on nutritious foods for their pets. The first of the series\* will appear in the April issue of *Super Market Merchandising*. It is a four-page article, entitled "Profits in Pet Foods." Some of the topics discussed are packaged dog food, the value of food elements, quality, testing and research.

Considerable space on the program of the AAHA convention in Buffalo this month will be given to the testing program and the seal of approval. A representative of a member hospital of the American Animal Hospital Association in Hawaii is expected to attend this meeting.

Clippings on publicity stories released in connection with statements about the seal of approval, presented at various state meetings, show a growing acceptance of such publicity material.

\*See page 340 of this issue.

# APPLICATIONS

## First Listing

**BILLHYMER, W. V.**

Arcadia, Ind.

D.V.M., Indiana Veterinary College, 1918.

Vouchers: E. W. Kline and M. M. Seeger.

**BLAMEY, F. W.**

328 Colorado Ave., Pueblo, Colo.

D.V.M., Colorado State College, 1921.

Vouchers: A. N. Carroll and I. E. Newsom.

**CARTER, PHILIP RAY**

Veterinary Station Hospital, Fort Snelling, Minn.

D.V.M., Kansas State College, 1926.

Vouchers: R. B. Meeks and John N. Campbell.

**DARBY, CHARLES WILLIS**

159½ Durand St., East Lansing, Mich.

D.V.M., Michigan State College, 1940.

Vouchers: C. F. Clark and E. T. Hallman.

**DOWNEY, H. A.**

1616 N. Morrison St., Appleton, Wis.

D.V.M., Kansas City Veterinary College, 1918.

Vouchers: James S. Healy and W. R. Winner.

**HARDY, L. V.**

586 Carlyle Pl., Union, N. J.

D.V.M., St. Joseph Veterinary College, 1920.

Vouchers: J. R. Porteus and R. A. Hendershott.

**KEITHLY, ARTHUR G.**

Walden, Colo.

D.V.M., Colorado State College, 1934.

Vouchers: E. N. Stout and I. E. Newsom.

**LANGE, A. W.**

201 W. Devon St., Milwaukee, Wis.

D.V.M., Chicago Veterinary College, 1912.

Vouchers: J. V. Lacroix and James S. Healy.

**MANGUS, DON E.**

316 S. Meridian St., Portland, Ind.

D.V.M., Chicago Veterinary College, 1914.

Vouchers: Edgar D. Wright and H. W. Brown.

**MERCER, ROBERT**

225 W. McClellan St., Flint, Mich.

D.V.M., Michigan State College, 1940.

Vouchers: C. F. Clark and E. S. Conklin.

**SCHLOSSER, DANIEL B.**

531 W. Linden Ave., Logansport, Ind.

D.V.M., Alabama Polytechnic Institute, 1937.

Vouchers: Chas. W. Fisher and Harvey F. Page.

**SHANNON, L. D.**

Box 522, Rhinelander, Wis.

D.V.M., Iowa State College, 1927.

Vouchers: W. V. Hornbacker and James S. Healy.

**STONE, EARLE C.**

336 Midwood St., Brooklyn, N. Y.

D.V.M., Cornell University, 1922.

Vouchers: Leon Roth and Alfred W. Meyer.

**TAMOGLIA, T. W.**

137 Ross St., White Hall, Ill.

D.V.M., Colorado State College, 1936.

Vouchers: J. W. Joss and A. E. Bott.

## Second Listing

Bailey, Alfred L., 2714 Olive St., Kansas City, Mo.

Batchelder, Ray M., 3 East Lane Ave., Columbus, Ohio.

Brand, J. M., 930 Sutter St., San Francisco, Calif.

Dinsmore, Richard J., R. F. D., Marlborough, Mass.

Faulkner, C. M., Manhattan, Ill.

Fortune, R. L., 62 Port St., Pulaski, N. Y.

Grayev, A. Theodore, 1022 Bluff St., Dubuque, Iowa.

Henderson, H. E., Wilton Junction, Iowa.

Hoffert, Elwood J., 522 S. State St., Caro, Mich.

Kaiser, J. C., Rockwell, Iowa.

Leibert, Arthur L., R. D. 1, Emmaus, Pa.

Logan, William C., P. O. Box 141, Nashville, Ill.

Lucas, James R., Morrisonville, Ill.

McFadden, M. C., 3100 E. 1st St., Sioux City, Iowa.

Meyerowitz, Bernard, 1375 E. 57th St., Chicago, Ill.

Nebeker, Shirley, Box 333, Ogden, Utah.

Nomura, Paul T., 767 Ala Moana, Honolulu, Hawaii.

O'Hara, Albert J., 700 College Ave., Northfield, Minn.

Pierson, I. J., Lock Box 364, Lawrence, Kan.

Rasmussen, J. E., 3760 Riverdale Rd., Ogden, Utah.

Salter, William Reed, 2032-27th St., Des Moines, Iowa.

Schmidt, Norman P., 366 Keele St., Toronto, Ont.

Sinclair, Roy I., 366 Keele St., Toronto, Ont.

Suydam, B. Webster Jr., 441 George St., New Brunswick, N. J.

Wintringham, H. B., Lakeport, Calif.

Wood, Emlen, 2210 Locust St., Philadelphia, Pa.

Wrbel, Arnold, 1710 Hoe Ave., New York, N. Y.

\*See January 1941 issue, page 88.



# BRIDGING THE GAP BETWEEN THE LIVESTOCK OWNER and the VETERINARIAN

*-the Educational Campaign of the American Foundation for Animal Health*

THIS CAMPAIGN IS SPONSORED BY THE ASSOCIATED SERUM PRODUCERS

ALLIED LABORATORIES, INC.  
BLUE CROSS SERUM CO.  
CORN BELT SERUM CO., INC.  
FORT DODGE LABORATORIES, INC.  
GRAIN BELT SUPPLY CO.  
JENSEN-SALSBERY LABORATORIES, INC.  
LIBERTY LABORATORIES  
MISSOURI VALLEY SERUM CO.  
NORDEN LABORATORIES  
PITMAN-MOORE CO.  
PLATTE VALLEY SERUM CO.  
SIOUX CITY SERUM CO.  
SIOUX FALLS SERUM CO.  
THE COLUMBUS SERUM CO.  
THE CORN STATES SERUM CO.  
THE GREGORY LABORATORY  
THE NATIONAL LABORATORIES CORPORATION  
THE ROYAL SERUM CO.  
THE SOUTHWESTERN SERUM CO.  
THE UNITED SERUM CO.

YOUR PATRONAGE OF THESE COMPANIES MAKES POSSIBLE THIS CAMPAIGN

Educational work continued by Associated Serum Producers.

Another intensive campaign to educate livestock owners to increased use of the veterinarian's services began in February under the sponsorship of the Associated Serum Producers. Conducted for the sixth year through the producers' educational bureau, the American Foundation for Animal Health, the program will employ the following channels:

- 1) Semi-monthly news releases to 1,200 newspapers.
- 2) A series of illustrated articles on livestock diseases to more than 1,000 newspapers.
- 3) Livestock health messages on 117 radio stations.
- 4) A spring and fall campaign to 16 farm magazines.
- 5) Spot-announcement warnings regarding hog cholera over 17 radio stations.
- 6) Feature articles on livestock subjects to 3,500 newspapers.

As the season for various livestock diseases progresses, timely educational material will be issued on the subject of these diseases, urging livestock owners to consult their veterinarian for reliable diagnosis and treatment. In the past several years veterinarians have reported increasingly good effects of this campaign and leaders in the industry expect the 1941

effort to produce more tangible benefits to the profession than any program thus far.

Those who are underwriting the cost of the campaign are:

- Allied Laboratories, Inc., Kansas City, Mo.  
 Blue Cross Serum Co., Superior, Neb.  
 Corn Belt Serum Co., Inc., East St. Louis, Ill.  
 Fort Dodge Laboratories, Inc., Fort Dodge, Iowa.  
 Grain Belt Supply Co., South Omaha, Neb.  
 Jensen-Salsbery Laboratories, Inc., Kansas City, Mo.  
 Liberty Laboratories, Omaha, Neb.  
 Missouri Valley Serum Co., Kansas City, Kan.  
 Norden Laboratories, Lincoln, Neb.  
 Pitman-Moore Co., Indianapolis, Ind.  
 Platte Valley Serum Co., Grand Island, Neb.  
 Sioux City Serum Co., Sioux City, Iowa.  
 Sioux Falls Serum Co., Sioux Falls, S. Dak.  
 The Columbus Serum Co., Columbus, Ohio.  
 The Corn States Serum Company, Omaha, Neb.  
 The Gregory Laboratory, White Hall, Ill.  
 The National Laboratories Corporation, Kansas City, Kan.  
 The Royal Serum Co., Kansas City, Kan.  
 The Southwestern Serum Co., Wichita, Kan.  
 The United Serum Co., Kansas City, Kan.

## U. S. GOVERNMENT

### Army Veterinary Corps

**Regular Army.**—First Lieutenant Edwin J. Sunderville is relieved from assignment and duty at Fort Oglethorpe, Ga., assigned to station at Atlanta General Depot, Atlanta, Ga., and directed to proceed to the Chicago Quartermaster Depot, Chicago, Ill., for temporary duty for a period of approximately one month for the purpose of pursuing a course of instruction to begin February 10, 1941, upon completion of which he will proceed to the Atlanta General Depot.

Lieutenant Colonel Harry L. Watson is relieved from assignment and duty at Fort Huachuca, Ariz., and is assigned to duty at Phoenix, Ariz.

Captain Edgerton L. Watson is relieved from assignment and duty at Fort Hamilton, N. Y., effective on or about March 3, 1941, and is then assigned to duty at Indiantown Gap Military Reservation, Pa.

Major Herbert M. Cox is relieved from assignment and duty at Fort Bliss, Texas, effective on or about March 3, 1941, and is then assigned to duty with the Fourth Corps Area Service Command, Camp Shelby, Miss.

Lieutenant Colonel Harry J. Juzek is relieved from assignment and duty at Vancouver Barracks, Wash., and from additional duty as attending veterinarian, Portland, Ore., effective on or about March 3, 1941, and is then assigned to the Fourth Corps Area Service Command, Camp Livingston, La.

Colonel Clell B. Perkins is relieved from assignment and duty at headquarters, Eighth Corps Area, Fort Sam Houston, Texas, effective on or about March 3, 1941, and is then assigned to headquarters, Third Army, San Antonio, Texas.

Lieutenant Colonel James A. McCallam is relieved from assignment and duty at Fort Sill, Okla., effective on or about March 3, 1941, and is then assigned to headquarters, Eighth Corps Area, Fort Sam Houston, Texas.

So much of Special Orders as assigns Major Verne C. Hill and Captain Curtis W. Betzold to headquarters, South Central Remount Area, San Angelo, Texas, and Fort Bliss, Texas, respectively, upon completion of their tour of foreign service, is revoked.

**Veterinary Corps Reserve.**—The following veterinary reserve officers (first lieutenants unless otherwise indicated) have been ordered to extended active duty by the War Department during the month of February and assigned to stations indicated:

Tyler J. Young, Army Medical Center, Washington, D. C.

Major John W. Burke, Carlisle Barracks, Pa.  
John L. Cox, Fort Bliss, Texas.

Louis E. Stanton, Carlisle Barracks, Pa.  
Roy A. Resseguie, Chicago Quartermaster Depot, Chicago, Ill.

First Lieutenant Henry Donelson is relieved from his present assignment and duty at Fort Sam Houston, Texas, and is assigned to duty at the San Antonio General Depot, San Antonio, Texas.

First Lieutenant Walter A. Anderson is relieved from his present assignment and duty at McChord Field, Wash., effective in time for him to proceed to San Francisco, Calif., and sail on the transport scheduled to leave that port on or about March 22, 1941, for the Hawaiian department for assignment to duty with the Veterinary Corps.

Each of the following-named officers (first lieutenants unless otherwise indicated) is relieved from assignment to station as indicated and is assigned to the 3d Cavalry Brigade, Fort Riley, Kan.:

Captain Guy H. Todd, Fort Riley, Kan.

Herman A. Jokerst, Fort Riley, Kan.

Marion J. Jones, Fort Riley, Kan.

Carl H. Koll, Fort Riley, Kan.

James H. Hathaway, Fort Riley, Kan.

James H. Watson, Fort Riley, Kan.

Emil L. Koch, Fort Snelling, Minn.

Clifford N. Decker, Fort Snelling, Minn.

First Lieutenant Howard E. McCutchan is relieved from assignment and duty at Fort Meade, S. Dak., and is assigned to the 10th Cavalry, Fort Riley, Kan.

First Lieutenant Alton M. Coddington is relieved from assignment and duty at Fort Des Moines, Iowa, and is assigned to the 10th Cavalry, Fort Riley, Kan.

First Lieutenant Harold L. Geick is relieved from assignment and duty at Fort Snelling, Minn., and is assigned to the Seventh Corps Area Service Command, Fort Riley, Kan.

First Lieutenant Thomas McC. Eagle is relieved from assignment and duty at Jefferson Barracks, Mo., and from temporary duty at the Chicago Quartermaster Depot, Chicago, Ill., effective upon completion of course at the Chicago Quartermaster Depot on or about March 10, 1941, and is then assigned to the Second Cavalry Division, Fort Riley, Kan.

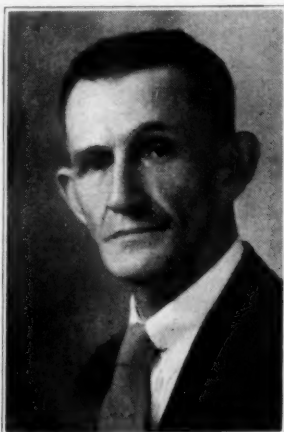
First Lieutenant Edward J. Watson is relieved from further assignment and duty at Presidio of Monterey, Calif., effective upon his return to that station from temporary duty at the Army Medical Center, Washington, D. C., and is then assigned to Fort Ord, Calif.

## STUDENT CHAPTER ACTIVITIES

### Alabama Polytechnic Institute

In appreciation of distinguished service to Alabama Polytechnic Institute, a portrait of I. S. McAdory, second dean of the School of Veterinary Medicine and longtime member of the faculty, was presented to the college recently by the Alabama chapter.

In making the presentation to President Duncan, S. D. Haworth of Okeene, Okla., president of the chapter, said: "It gives me great pleasure to present this picture of a man who has always been in the front ranks of those concerned with the progress of Auburn, a man who is loved most of all by the students of this department, who affectionately call him 'Dr. Mac.' It is hereby ordained that this portrait shall be placed beside that of Dr. Cary in the new building of veterinary medicine to serve as a reminder of distinguished service to all who enter the doors of that building."



I. S. McAdory

At a meeting held on March 18, the Auburn chapter heard J. M. Robinson, professor of zoölogy and entomology at Alabama Polytechnic Institute, speak on bees and their production of honey. He discussed the anatomy of the bee, its process of reproduction, the making of honey, and the bee industry in the United States as a source of income.

### Kansas State College

A. D. Weber and W. E. Grimes of the departments of animal husbandry and economics, respectively, at Kansas State College, addressed the chapter at recent meetings. The former spoke on feeding problems and feeding errors which confront the livestock owner and veterinarian.

Mr. Grimes' address comprised a consideration of the following questions: (1) What effect will the preparedness of our country have on us? (2) What changes in social life will occur when this is over? (3) Will we have inflation? If so, what will be the consequences?

Three student speakers—C. C. Smith, Rodney Port and John Gish—have appeared thus far on the programs. Their talks concerned summer experiences in the field.

H. P. CALLAWAY, *Secretary*.

### Iowa State College

A regular meeting of the Iowa chapter was called to order by President Tietze on March 5.

Dr. Craft, regional director of the federal swine-breeding program, discussed the development of this work and predicted that further progress would be made.

George R. Fowler of the veterinary faculty was called upon to announce the incoming officers of *The Veterinary Student*, and a standing vote of applause was accorded the retiring officers of that publication.

Mr. Miner made a motion that the chapter give keys to the incoming editor and business manager, and their successors, in recognition of service they perform. The motion was seconded and passed. Corwin Smith then moved that the retiring officers be similarly honored. This motion, too, was seconded and passed.

Roy Price reported on the spring dance, and Howard Beardmore joined him in calling for the division's full support of the event.

President Tietze appointed Ruben Kufrin chairman of the annual banquet committee. He appointed the following committee to determine the steps required to make *The Veterinary Student* the official organ of the chapter: Miner, chairman; Read, senior member; Tobola, junior member; Calhoun, sophomore member; and Preusser, freshman member.

JOE A. GRAHAM, *Secretary*.

## AMONG THE STATES

### Alabama

**Library Interest Grows.**—Through the coöperation of the staff of the main library, the use of the library by the students in the School of Veterinary Medicine at Alabama Polytechnic Institute has increased more than 100 per cent.

Since the excellent library facilities were not being used to the best advantage, it was arranged to have members of the library staff give lectures on the material available in the library, the various sources of information, and how best to use these references. This was followed by demonstrations, to small groups at a time, on actually looking up assigned readings. The use of the various subject and author



files and how to go through a book rapidly for a clue as to its contents, were emphasized.

Following these lectures and demonstrations, the use of the library, as determined by books called for, has increased to the extent where it is now necessary to keep the veterinary library open evenings and on Saturday and Sunday afternoons, in order to meet the student demand.

### Arkansas

Governor Bailey has signed a bill providing for the licensing of persons who have operated small animal hospitals for the past five years. The bill (S.B. 93) was introduced by Senator Charles Frierson, Jr.

### California

A bill appropriating \$1,000,000 to establish a veterinary school in the state university was introduced in the House of the California General Assembly, March 1, 1941. The bill directs the Board of Regents of the university to establish a "college of veterinary medicine."

### Colorado

Fur farming is an agricultural pursuit and, therefore, does not come under the provision of the Unemployment Compensation and Unemployment Service Act, according to a decision handed down in the District Court in the case of the Genessee Mountain Fox & Mink Farms, Inc., *vs.* the State of Colorado. The decision

is far-reaching in the fur-farming industry, *The Fur Journal* (Feb. 1941) declares.

### Connecticut

**Annual Meeting.**—The annual session of the Connecticut Veterinary Medical Association was held at the Hotel Bond in Hartford, February 5.

N. W. Pieper of Middletown was elected president; G. H. Ludins of Hartford, first vice-president; R. T. Gilyard of Waterbury, second vice-president; and Geo. E. Corwin of Hartford, secretary-treasurer. The Board of Censors comprises F. I. Maxon of Hartford, G. L. Cheney of Woodbridge, J. P. McIntosh of Kensington, J. B. Skelton of Riverside and Edwin Laitinen of Hartford.

During the meeting Maurice E. Ryan of Stamford and C. Earle Guthrie of Norwalk were admitted to membership.

GEO. E. CORWIN, *Secretary.*

### District of Columbia

Officers of the Medical Department, U. S. Army, held a meeting at the Sternberg Auditorium, Army Medical Center, February 17, 1941. Colonel Kelser of the Veterinary Corps spoke on "Respiratory Diseases of Lower Animals Analogous to Those of Man." The attendance at this event was about 300. Among this number were 25 veterinary officers from Front Royal, Fort Meade, Carlisle Barracks, and the



At the Colorado short course (Colorado State College, Fort Collins, February 17-20, 1941), several of the fathers of Colorado State College veterinary students were on the campus and advantage was taken of the occasion to assemble as many veterinary-student sons of veterinarians as possible and have their picture taken with their fathers.

Front row, left to right: Wm. Clough Cullen, Mankato, Minn.; Garrett N. Bouton, Aurora, Colo.; S. W. Beggs, Lamar, Colo.; A. N. Carroll, Pueblo, Colo.; W. G. Blake, Greeley, Colo.; A. E. Hasselbalch, St. Edward, Neb.; G. E. Clark, Fowler, Colo.; A. A. Hermann, Denver, Colo.; William Green, Fort Collins, Colo.; Bryant Nisley, Gothenburg, Neb.

Back row, left to right: William Laird, Bell, Calif.; Sterling Barber, Exeter, Neb.; William Beggs, Lamar, Colo.; Winston Tornow, Denver, Colo.; W. Pershing Blake, Greeley, Colo.; Neal Hasselbalch, St. Edward, Neb.; Sterling Clark, Fowler, Colo.; Leonard Peavy, Fort Collins, Colo.; Clayton Mikkelsen, Phoenix, Ariz.; Edward W. Spratlin, Littleton, Colo.; Richard Eberle, Silcox, Mo. (Note: A. A. Hermann is the father-in-law of Leonard Peavy.)

Absentee students: Walter Carroll, Pueblo, Colo.; John Crump, Flagstaff, Ariz.; Laurence McCain, Omaha, Neb.

Army Veterinary School. A buffet supper was served at the conclusion of the session.

W. M. MOHLER, *Resident Sec'y.*

### Georgia

**Bad Legislation Proposed.**—According to the provisions of a bill introduced in the state senate, the Board of Regents of the college of agriculture at the state university will be required to establish a three-year course in veterinary medicine (and surgery) that will lead to the degree of Doctor of Veterinary Medicine, and a similar bill would shorten the time required to acquire the degree of Doctor of Medicine. The object of establishing the veterinary course, a legislator says, is a "crying need," since Georgians now have to go to Alabama to get a veterinary education. The proponents of this legislation evidently are not aware that the graduates would not have any standing before the examining boards of many other states nor be acceptable for the national service. What Georgia needs is legislation that will enable livestock men to pay for the service they already have.

J. E. SEVERIN.

The General Assembly has abolished the office of state veterinarian and directed that the records be turned over to the state department of agriculture, which will hereafter make that appointment. The action automatically removes J. M. Sutton from office and gives Governor Talmadge the power over that office he has long sought.

### Illinois

The public laws of the state and general information about the state department of public health and health of the population have been compiled and published in a volume that is available for limited free distribution. Veterinarians engaged in public health work will be interested in this book.

The five-year fight against the use of paper milk containers instead of glass bottles has been carried to the United States Court of Appeals by the Chicago department of health. In October 1940, Federal Judge Woodward granted an injunction to the Dean Milk Company charging that the city's action in prohibiting the use of paper cartons was discriminatory and, therefore, not constitutional.

**Merillats Celebrate Golden Anniversary.**—On Sunday afternoon, March 16, scores of friends visited the home of Major and Mrs. L. A. Merrillat, Jr., in Chicago to extend greetings to Dr. and Mrs. L. A. Merrillat, Sr., on the occasion of their golden wedding anniversary. Veterinarians and their wives from several mid-western states were present.

Congratulatory messages were received from

all over the country, testifying to the place which "Dad" and "Ma" Merrillat occupy in the hearts of countless friends and to the gratitude of the many men in the profession who, in their student days, were befriended and counseled by them. Surely, few people have given more largely of themselves, in a lifetime of accomplishment, to the benefit of others than this couple who have been intimately and integrally a part of the veterinary scene during the past five decades.

Dr. and Mrs. Merrillat received many fine gifts and were nearly "snowed under" by an avalanche of flowers. A sumptuous repast was served, crowned by a gigantic wedding cake.—J. G. H.

### Indiana

Prominent Holstein breeders of the Northern Indiana Holstein Breeders Association were addressed at their meeting of February 27 in Fort Wayne by two local veterinarians, F. Hall of Garrett and G. L. Clark of Columbia City, who spoke, respectively, on "Common Diseases of Cattle" and "Vaccination of Heifer Calves."

### Iowa

**Blohm Joins Iowa Faculty.**—Frank D. Blohm (Iowa '32) has been appointed diagnostician in the veterinary diagnostic laboratory at Iowa State College, Ames. He succeeds Ernest F. Waller (Iowa '31), who resigned December 15, 1940, to accept a position in poultry-disease research at the University of New Hampshire.

Dr. Blohm was in practice from 1932 to 1935, when he entered the U. S. Bureau of Animal Industry on Bang's disease control, continuing in that work until his present appointment, March 1, 1941.

**Swine Erysipelas.**—Further intensification of the drive against swine erysipelas is evidenced by a series of regional meetings to be held in southwestern Iowa under the auspices of the Southwestern Iowa Veterinary Medical Association. The first of these meetings was held at Red Oak in mid-January and the next was at Atlantic on February 24. Dr. Gray of the BAI Laboratories, Lincoln, Neb., was the main speaker and the round-table discussions covered every phase of the disease, including technics and regulations for the new serum-culture method of prophylaxis. Widespread immunization of spring pigs on exposed farms is planned for the coming season.

Many Iowa veterinarians have already expressed their intention of attending the meeting of the AVMA at Indianapolis next August; in fact, the Iowa delegation will no doubt be larger than that of any AVMA meeting to date, not excluding Omaha.

F. R. Taylor of Osceola, Iowa, is the newly elected president of the Central Iowa association, which meets monthly in Des Moines. At the February 13 meeting and dinner the members were agreeably surprised by the attendance of Wm. Feldman of The Mayo Foundation, Rochester, Minn., who was enroute to Colorado. The feature speaker of the evening was Dean Chas. Murray of Iowa State College, who talked on veterinary education.

• • •

With an attendance of 501 at their annual meeting in January, Iowa veterinarians have set an enviable attendance record for state associations. Plans are already under way for a "bigger and better" meeting next year.

• • •

Several Iowa veterinarians have stated that they would like to see a "veterinary golf tournament" staged in connection with the AVMA meeting. Quite a number of Hawkeye practitioners swing clubs with near professional ability and they might consider sending a team against those of other states.

A. H. QUIN, *Resident Sec'y.*

• • •

**Fayette County Society.**—Twenty-seven veterinarians and almost as many ladies attended the monthly dinner-meeting of the Fayette County Veterinary Medical Society at Legion Hall, Fayette, Iowa, February 18, 1941, on a bitterly cold night. These men hailed from Bremer, Blackhawk, Buena Vista, Buchanan, Cerro Gordo, Allamakee, Polk, Winneshiek, Fayette, Linn, and Clayton counties.

Inspector-in-Charge J. A. Barger of the United States Bureau of Animal Industry, Des Moines, was the main speaker. His subject was calfhood vaccination and the Bang's disease testing program. His talk inspired a lively discussion led by E. L. Finley of Waverly; George J. Sexton, Sumner; R. E. Glew, Maynard; and C. L. Crider, Elkader.

Veterinary Inspector John S. Koen, Storm Lake, Iowa, also of the BAI gave a talk on the world's largest hog ranch, Fontana Farms, and methods of disease control successfully practiced there.

President Kenneth L. Ritchie, West Union, presided. The committee for the evening's program was E. L. Finley, Waverly, and Joe W. Giffie, Cedar Rapids.

## Kansas

The southeast group held a meeting in the city auditorium at Chanute, February 28, with L. L. Rush and P. B. Darlington as the hosts of 20 members and 10 ladies. The meeting opened at 2:00 p. m. and wound up with a

chicken dinner at the local hotel.

Ashe Lockhart and J. C. Flynn of Kansas City, Mo., were the principal speakers. The method of preparing and testing the new rabies vaccine, calf scours and equine encephalomyelitis vaccination brought out lively discussions, particularly in regard to the charge that should be made for rabies and sleeping-sickness vaccination.

• • •

**Annual Convention.**—The 37th annual convention of the state association met in Manhattan, January 8-9, 1941, at the Veterinary Division of Kansas State College. In spite of the crowded condition of Manhattan due to the defense program at Fort Riley all were comfortably housed, thanks to the Manhattan Chamber of Commerce. One hundred and sixty-eight veterinarians and visitors were in attendance.

The members were saddened by the news that one of the members, David R. Lindsay of Anthony, met an untimely death in a dense fog on his way to the meeting. His car collided with an oil truck, killing him instantly. Dr. Lindsay had been a member of the Association for eleven years. His attendance was regular and he was keenly interested in his profession.

Dean L. E. Call of the Division of Agriculture in his address of welcome pointed out the advantages to the Kansas veterinarians of having a veterinary school within their own state and that problems of research as well as veterinary education are going on daily at the veterinary school which has solved many difficult problems concerning diseases of livestock.

Kent R. Dudley of Iola, responding to the dean's address, voiced the sentiment of the entire membership when he said, "Kansas veterinarians always like to meet in Manhattan. The veterinary staff at Kansas State College are good hosts and the facilities are excellent for holding demonstrations and illustrated lectures."

The Department of Poultry Husbandry presented a color-sound film showing the "Formation of the Hen's Egg." The film, an excellent piece of work, has been shown all over the United States.

S. L. Stewart of Olathe presented a paper on milk fever. While an old disease and the treatment for it is far more successful than that of some other diseases of livestock, Dr. Stewart brought out many points yet to be solved. "In milk fever," says Dr. Stewart, "the blood pressure is greatly reduced, and the lower it is the more grave is the animal's condition." He compared the disease to brain anemia resulting in coma, and added that over years of practice he has noted that weather conditions influence the incidence. For example, he said that "When the days are



sultry, cloudy and humid look out for a lot of milk fever, but when bright and the sun is shining cases are few."

Thomas P. Crispell of Parsons in discussing the milk fever paper warned that the cow should not be milked out for twenty-four hours and then only one-fourth of the milk from each quarter three times daily. The next day remove one-half of the milk and on the third day all of it. "Purgatives are generally unnecessary," said Dr. Crispell, "and may have a tendency to put her down again." "Hormones seem to have a great future in the treatment of milk fever." He recommended 100-cc. doses of sodium iodide (0.2 Gm. per cc.) intravenously for cases that are slow to respond to the usual treatment.

A clinic and pathological exhibit were given by the veterinary staff in the afternoon.

J. H. Whitlock's demonstration of the Stoll egg count for parasites was a fine presentation of that method, and "Friedman's test for pregnancy," demonstrated by W. W. Thompson, was likewise interesting and appreciated.

E. R. Frank discussed "Some Surgical Procedures in Horses and Cattle." As Dr. Frank's surgical demonstrations are always outstanding his contribution was praised highly.

"Ketosis in Sheep" presented by L. M. Rodrick and R. P. Wagers was a live topic, since sheep raising is increasing in Kansas. S. J. Roberts demonstrated "Paralumbur Block in Cattle," a form of spinal anesthesia. Because the modern veterinarian resorts more and more to anesthesia any operation which can be done with the minimum amount of pain is apt to be popular. R. P. Link demonstrated a "Field Test for Ketosis in Dairy Cattle."

The house pet was not neglected. G. R. Moore demonstrated restraint of cats and E. J. Frick intestinal lavage in dogs.

A dinner and entertainment were held at the Hotel Wareham. The after dinner speakers were A. E. Wight, president of the American Veterinary Medical Association, and Professor William Troutman of the Department of Speech. Professor Troutman's subject was "Topsy Turvy Land."

Thursday morning, January 9th, the session opened with a silent film entitled "Control of Worms in Hogs." This was followed by J. D. Ray of Omaha on "Swine Erysipelas and Human Erysipeloid." "Swine erysipelas is fast becoming one of the major diseases of hogs in the Corn Belt," the speaker warned. He warned veterinarians and livestock owners to take no chances with the disease. It not only causes great loss to the country but also produces the disease of man known as erysipeloid which may become quite acute and very dangerous. The treatment, developed within recent months, however, has greatly reduced the

mortality. "Anti-erysipelas serum," said Dr. Ray, "when used as a wet compress locally to the lesions is specific."

C. G. Cole of the United States Bureau of Animal Industry, Ames, Ia., reported on experiments done with the new crystal violet vaccine against hog cholera.

The Bang's disease situation was discussed by A. E. Wight, chief of tuberculosis and Bang's disease control, United States Bureau of Animal Industry, Washington, D. C. "An adequate supply of meat and dairy products is as vital to national defense as guns and planes," said Dr. Wight, "and it is the responsibility of the veterinary profession to protect the supply of these important foods."

A question box conducted by E. F. Sanders of Kansas City, Mo., gave the audience a chance to bring up many of the problems confronting them. Much is always gained when such questions and answers are discussed in open meeting.

Thursday afternoon C. D. Folse of Kansas City, Kan., acting for the Kansas City Veterinary College Alumni Association, presented to the Division of Veterinary Medicine portrait paintings of S. Stewart, R. C. Moore and A. T. Kinsley. Following the presentation L. D. Frederick, chief veterinarian of Swift & Company of Chicago, Ill., spoke on sheep diseases. Dr. Frederick presented his own findings in sheep diseases which covered a period of many years acting in his official capacity.

J. A. Bogue of Wichita spoke on the "Program of Dog-Food Testing as sponsored by the American Animal Hospital Association and American Veterinary Medical Association." "Kansas farmers and livestock producers will sell more of their products as a result of the dog-food-testing program of the veterinary profession," said Dr. Bogue. He further declared, "Kansas' chief economic wealth is in her crops and in her cattle. Anything which helps our farmers to sell more corn, wheat or oats or more meat is of direct benefit to the entire state. The dog-food-testing program is a measure which will help to sell more of the products of Kansas farms because it will put more meat and cereals into dog food."

Dr. Bogue revealed that according to experts there are between fifteen and twenty million dogs in the country and said the number is increasing steadily.

R. F. Coffey of Topeka was elected president for 1941; H. F. Dotson of Wichita, vice-president and Chas. W. Bower of Topeka was re-elected secretary-treasurer. S. L. Stewart was elected to the Executive Board.

Wichita was chosen as the meeting place for the 1942 annual convention.

CHARLES W. BOWER, *Secretary*.

### Kentucky

The Central Kentucky Veterinary Medical Association held its annual dinner meeting at the Fayette Hotel in Lexington, January 29, 1941. C. H. Holmes of Lexington was chosen president to succeed T. P. Polk, A. H. Davidson, first vice-president, and W. E. Thomas, secretary-treasurer. Among those present were C. H. Case of Akron, Ohio; Major J. C. McGraph of the Army; State Veterinarian D. E. Westmorland; F. R. Beister of Louisville, secretary-treasurer of the state association; and W. W. Dimock of the Kentucky Agricultural Experiment Station. Dr. Dimock's candidacy for the office of president-elect of the AVMA was unanimously endorsed at the business session.

### Louisiana

**Veterinary Conference.**—The tenth veterinary conference of the state university was held at Baton Rouge, February 26-27, under the sponsorship of the state association.

President J. D. Jones introduced J. G. Lee, Jr., dean of the university, who delivered the address of welcome. Carle Libby, local BAI representative, responded. The out-of-state speakers were Jas. Farquharson of Colorado State College, Charles W. Bower of Topeka, Kan., and B. T. Simms of the Regional Research Laboratory, Auburn, Ala. W. W. Frank of the BAI force in Louisiana, Commissioner of Agriculture Harry D. Wilson and J. H. Musser, M.D., state director of health, were contributors to the program.

Artificial insemination, blood transfusion, anesthetic methods, examinations for blood

parasites and demonstrations on large animals were feature events.

### Maine

**Bang's Disease Work.**—A committee of veterinarians and stockmen are sponsoring a bill before the state legislature providing an appropriation of \$450,000 to carry on Bang's disease work. The request calls for a bond issue of that amount to be retired at the rate of \$55,000 annually. The legislature is also being asked to pass a revision of the veterinary practice act authorizing the board of examiners to reject applicants for license who are not graduates of recognized veterinary colleges, and to revoke licenses for malpractice.

• • •

J. F. Witter (Mich. '32), animal pathologist of the University of Maine, was recently appointed consulting veterinarian for Chief D. P. Corbett, Division of Animal Industry, State Department of Agriculture, and will carry out the duties of this office in addition to his position at the University. These changes come at a critical time when the state legislature is considering an appropriation to finance a Bang's disease program embracing a test-and-slaughter and vaccination plan. The veterinarians of the state are hoping that the program will get under way this spring.

### Manitoba

**Annual Meeting.**—The 51st annual meeting of the Manitoba Veterinary Association was held at the Marlborough Hotel in Winnipeg.



### NEVADA STATE VETERINARY ASSOCIATION

Members and guests in attendance at the annual meeting of the Nevada state association (January 31, 1941, at Reno) were (left to right) Edward Records, H. A. Reager, F. H. Baker (newly elected president), Geo. E. Bamberger, W. F. Fisher, S. J. Nielsen, W. R. Sheff, W. R. Smith, G. T. Woodward, T. H. Leenerts, S. D. Mastroianni, Ernest Brooks, Warren B. Earl, S. H. Still, Thomas M. Thompson, O. W. Schelm, W. W. White, L. R. Vawter.

February 14, with approximately 50 veterinarians in attendance.

E. D. Bowes, general practitioner of Boissevain, was elected president and A. M. McFarlane of the Health of Animals Division, Dominion Department of Agriculture, was elected vice-president.

Secretary-Treasurer W. Hilton's report revealed the Association to be in sound financial condition, and despite the difficult conditions prevailing, an increase in membership was recorded for the year.

New members admitted were W. R. Giesbrecht, J. J. Andrich and A. R. J. McGregor, all of Winnipeg.

### Nevada

**Annual Meeting.**—The annual meeting of the Nevada State Veterinary Association was held in Reno, January 31. O. W. Schalm of the Division of Veterinary Science, University of California, Berkeley, Calif., was the guest speaker.

This session was unique in that there was 100 per cent attendance of the membership, and five new members were elected, which is a large number for a comparatively small association. One of the new members is S. H. Still, who recently arrived in Nevada to assume the position of inspector in charge for the U. S. Bureau of Animal Industry.

Officers were elected for the ensuing year as follows: F. H. Baker of Gardnerville, president; W. F. Fisher of Reno, vice-president; and Warren B. Earl of Reno, secretary-treasurer (reelected).

Excellent coöperation was received from the local press in publicizing the meeting.

WARREN B. EARL, *Secretary.*

### New York

**American Animal Hospital Association.**—The eighth annual meeting of the AAHA will be held at Buffalo, April 23-26, with headquarters at the Hotel Statler.

The program is said to have been planned in such a way as to interest general practitioners and to encourage them to engage in canine practice and provide reasonably capable service. The opportunity to develop small animal practice outside of large cities is pointed out.

The entertainment will include a trip to Niagara Falls over the famous Peace Bridge.

Especially signalized are the scientific exhibits, the convention banquet and floor show, and the clinic on the closing day, which is being planned by John D. Gadd of Maryland.

Frank E. McClelland (Buffalo), J. V. Lacroix (Evanston, Ill.), Joseph B. Engle (Summit, N. J.), and Otto Stader (Ardmore, Pa.) have been charged with arranging and directing the program.

**Hopson Joins DeLaval Co.**—In December 1940, George H. Hopson (Corn. '28), who for four years was milk sanitarian for the Kings County Medical Society and closely associated with the Certified Milk Producers' Association, resigned from that post to accept a position with the DeLaval Separator Co.



George H. Hopson

Dr. Hopson was selected because of his special background of training which fits him to carry on an educational and consultative program with the dairy industry and individual dairymen on problems of milk sanitation, and also to assist the company's research and educational departments. Such effort is intended to benefit not only milk producers and distributors, but to create and maintain closer relationships and contacts between actual operating conditions in the field and the firm's research department, representatives and dealers.

Dr. Hopson was brought up on a dairy farm in northern New York. After graduation from New York State Veterinary College at Cornell University, he was in general practice for several years. He then joined the staff of the Borden Farm Products Company, first as a milk inspector, later devoting a large part of his time to the training of other inspectors. His work during the past four years with producers of certified milk serving the metropolitan area of New York has been of great value to all concerned, especially in these days when standards of herd health are so high in the certified milk field.

Dr. Hopson's connection with the DeLaval company gives him a unique opportunity for service to the dairy industry and is a further recognition of the necessity of maintaining a close relationship between veterinary science and all aspects of quality milk production.

### Ohio

**Zimmer Goes to "Corn States."**—F. A. Zimmer (O.S.U. '09), former state veterinarian, has accepted a position with the Corn States Serum Company's Ohio branch. Dr. Zimmer has been an active worker in behalf of veterinary medicine for many years and has occupied important positions. In the office of state veterinarian he reformed the regulation of community sales and of the veterinary practice act.





F. A. Zimmer

Besides being twice state veterinarian, he served a term as president of the state association and represented the tenth district of the AVMA (Ohio and Michigan) as a member of the Executive Board.

### Pennsylvania

W. Graham Love, having accepted a position at Beltsville, Md., has resigned as corresponding secretary of the Pennsylvania Veterinary Medical Association, and Raymond Snyder of Philadelphia has been appointed to fill out the unexpired term.

### Washington

**New Practice Act.**—After four years of persistent effort, the Washington State Veterinary Medical Association has succeeded in getting a new practice act—considered a comprehensive and workable measure—enacted during the session of the state legislature just ended. The bill was signed by the governor a few days ago.

M. O. BARNES, *Secretary*.

## COMING MEETINGS

Small Animal Hospital Association. Los Angeles, Calif. April 1, 1941. W. K. Riddell, secretary, 3233 W. Florence Ave., Los Angeles, Calif.

New York City, Veterinary Medical Association of. Hotel New Yorker, New York, N. Y. April 2, 1941. J. J. Merenda, secretary, 136 W. 53rd St., New York, N. Y.

Dallas-Fort Worth Veterinary Medical Society. Dallas, Texas. April 3, 1941. Frank Brundrett, secretary, 1809 Atwood, Route 2, Dallas, Texas.

Houston Veterinary Association. Houston, Texas. April 3, 1941. John Tom Kirby, secretary, 2421 S. Shepherd Drive, Houston, Texas.

Midwest Small Animal Association. Burlington Hotel, Burlington, Iowa. April 3, 1941. C. L. McGinnis, secretary, 1314 Main St., Peoria, Ill.

St. Louis District Veterinary Medical Association. Roosevelt Hotel, St. Louis, Mo. April 4, 1941. J. P. Torrey, secretary, 555 N. 14th St., East St. Louis, Ill.

Chicago Veterinary Medical Association. Hotel Sherman, Chicago, Ill. April 8, 1941. G. S. Elwood, secretary, 5449 Broadway, Chicago, Ill.

Maine Veterinary Medical Association. University of Maine, Orono, Maine. April 9, 1941. J. F. Witter, secretary, Orono, Maine.

Southeastern Michigan Veterinary Medical Association. Medical Arts Bldg., 3919 John R. St., Detroit, Mich. April 9, 1941. F. D. Egan, secretary, 17422 Woodward Ave., Detroit, Mich.

Southern California Veterinary Medical Association. Chamber of Commerce Bldg., Los Angeles, Calif. April 16, 1941. Charles Eastman, secretary, 725 S. Vancouver Ave., Los Angeles, Calif.

Kansas City Veterinary Medical Association. Kansas City, Mo. April 21, 1941. Glen L. Dunlap, secretary, 800 Woodswether Road, Kansas City, Mo.

San Diego County Veterinary Medical Association. Zoological Research Bldg., Balboa Park, San Diego, Calif. April 21, 1941. Paul D. DeLay, secretary, State Poultry Pathological Laboratory, Balboa Park, San Diego, Calif.

Keystone Veterinary Medical Association. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa. April 23, 1941. A. Henry Craig, Jr., secretary, University of Pennsylvania, Philadelphia, Pa.

Massachusetts Veterinary Association. Hotel Westminster, Boston, Mass. April 23, 1941. H. W. Jakeman, secretary, 44 Bromfield St., Boston, Mass.

American Animal Hospital Association. Hotel Statler, Buffalo, N. Y. April 23-26, 1941. J. V. Lacroix, secretary, Box 550, Evanston, Ill.

District of Columbia Veterinary Medical Association. Mayflower Hotel, Washington, D. C. April 25, 1941. W. M. Mohler, secretary, 5508 Nebraska Ave., N. W., Washington, D. C.

Mississippi Valley Veterinary Medical Association. Armory, North Broad St., Galesburg, Ill. May 22, 1941. L. A. Gray, secretary, Bushnell, Ill.

American Veterinary Medical Association. Murat Theatre and Shrine Temple, Indianapolis, Ind. August 11-15, 1941. John G. Hardenbergh, executive secretary, 600 S. Michigan Ave., Chicago, Ill.

## DEATHS

**Lt. Colonel Lloyd C. Ewen** of the Veterinary Corps, U. S. Army, was fatally injured on February 18, 1941, while returning to Front Royal, Va., from a trip in connection with the purchase of Army animals.

Born in Blanchard, N. Dak., April 4, 1891, Colonel Ewen attended the North Dakota State College at Fargo and the University of Pennsylvania, graduating from the latter in 1917.

He was commissioned in the Veterinary Corps on July 16, 1917, and attained the rank of lieutenant colonel on August 3, 1937. At the time of death he was serving with the Eastern Remount Area, with headquarters at the Front Royal Remount Depot. He was graduated with honors from the Army Veterinary School in 1923.

Colonel Ewen joined the Association in 1918.

**Frank M. McConnell** of Litchfield, Mich., died in the Veterans' Hospital at Hines, Ill., February 7, 1941.

Born in Allen, Mich., June 30, 1887, Dr. McConnell was graduated from the Grand Rapids Veterinary College in 1915. He had been in general practice at Litchfield for 21 years.

**J. S. Gordon** of Omaha, Neb., died after a nine-week illness on March 15, 1941.

Born at Hartington, Neb., March 25, 1908, Dr. Gordon was graduated from Iowa State College in 1930. He had been in the employ of the U. S. Bureau of Animal Industry since 1934. He joined the Association in 1934.

**D. W. Nicholas** of Fairmont, Minn., died in Phoenix, Ariz., March 4, 1941.

Born at Williamsburg, Iowa, July 18, 1895, Dr. Nicholas was graduated from the Chicago Veterinary College in 1916. He joined the AVMA in 1939.

**W. P. Robertson** of Buncombe, Ill., died on January 30, 1941. He was a graduate of the Chicago Veterinary College, class of '16.

**W. J. Scott** of Clarkston, Wash., died on March 7, 1941, at the age of 73.

Dr. Scott was graduated from the University of Illinois prior to entering the veterinary division of Colorado State College. He was graduated from the latter in 1917.

**David R. Lindsay** of Anthony, Kan., was killed enroute to Manhattan, Kan., to attend the 37th annual convention of the Kansas Veterinary Medical Association, January 8, 1941.

## A Message from Germany

The following letter, dated December 10, 1940, arrived February 28, 1941, via Siberia. It was addressed to John R. Mohler, chief of the U. S. Bureau of Animal Industry, as follows:

Highly Honored Colleague:

During my sojourn in past years in your country, particularly in Washington, you were so amiable and helpful to me that I feel constrained to show my appreciation in some appropriate way. I had thought in this connection, since at the present time it is almost impossible for you to see what progress is being made in the field of science in Germany, that I would like to send you an issue of our journal from which you may learn, both by word and illustration, that research in Germany during the War has not come to a standstill.

As for me, I have been able through the co-operation of Dr. Traub to clear up the etiology of infectious catarrh of the air passages of horses. We have found in this disease that there is a combined action of a virus with hemolytic streptococci of the pyogenes type similar to the condition found by Shope in swine influenza. At this time we are engaged in cultivating the virus in pure culture and hope to be able to furnish you further reports on this work during the coming year.

At this time I should like to convey to you and your colleagues in the Bureau of Animal Industry whom I know and to your esteemed wife and your son warmest greetings and best wishes for the Christmas and New Year holidays. I sincerely hope that the year 1941 may bring us peace and the possibility of seeing you again at the Berlin International Veterinary Congress.

(Signed) **BELLER.\***

The lesson to be drawn from this letter is that war is more apt to speed up than to curtail scientific research on animal diseases.

\*Karl F. Beller, Professor of Veterinary Hygiene, University of Giessen, Germany.

The 500,000 tractors that farmers will buy during the next ten years will replace 1,500,000 horses and will leave 3,500,000 acres of land free to raise other grains besides horse feed, a report of the USDA announces. In the meantime there will not be enough colts raised to furnish needed work stock.

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Purified aluminum hydroxide is selective in its action as it almost completely adsorbs the antigens to the comparative exclusion of other substances present. The antigens remain in the adsorbed state until injected. The various aluminum salts (known as "alum") on the other hand have an inadequate adsorptive effect except in the presence of aluminum hydroxide and even then such adsorption is both nonselective and reversible. As a result, not all of the antigens are adsorbed and those that are may go back into solution.

For bacterins in which the antigens are truly adsorbed, so that the desirable extending effect is assured, insist on "aluminum hydroxide adsorbed."

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Formula 2 and 3

Streptococcus Bacterin  
(Equine)

Mixed Bacterin (Equine)  
Formula 1 and 2

Pelmenal

Mixed Bacterin (Ovine)  
Formula 1

Tetanus Toxoid

Mixed Bacterin (Porcine)  
Formula 1



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**Potency...backed by Dependability** . . . is a Fowler Brand requirement which gives you assurance of the Serum's efficacy and safety in your immunization work.

Today, *before* you need it, check your supply of Fowler Serum. It is available at most Armour Branch Houses and Creameries, and in every hour of the twenty-four from Dr. Robt. D. Wall, 910 28th Street, Des Moines; Dr. Robt. J. Hoskins, 3203 E. Washington Street, Indianapolis; Mr. A. G. Carter, Findlay, Ohio; Dr. H. W. Brown, 623 W. Main Street, Fort Wayne.

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## **An' Related Topics**

### **The Unstified Sneeze**

To what extent the unstified sneeze spreads grave diseases far and wide is not exactly known but that this spraying of germs and viruses into the air is one of the factors in spreading septic sore throat,



The unstified sneeze.

scarlet fever, whooping cough, influenza can hardly be called conjectural. When caught with a desire to sneeze better use a handkerchief, the *Illinois Health Messenger* pleads.

### **Obedience Tests for Dogs**

Practically every dog show of 1941 will feature some sort of obedience test as an adjunct to the usual exhibits of dogs for points that count in the race for championships and blue ribbons. In other words, in this class, performance takes the place of phenotype (what a dog looks like) and genotype (what a dog inherited).

The obedience test movement conforms to the notion of classifying animals as to performance rather than only as to the corporeal profile set down in the book of rules. To the outsider, the presumption is that what an animal does for its owner is a better measure of values than its architecture.

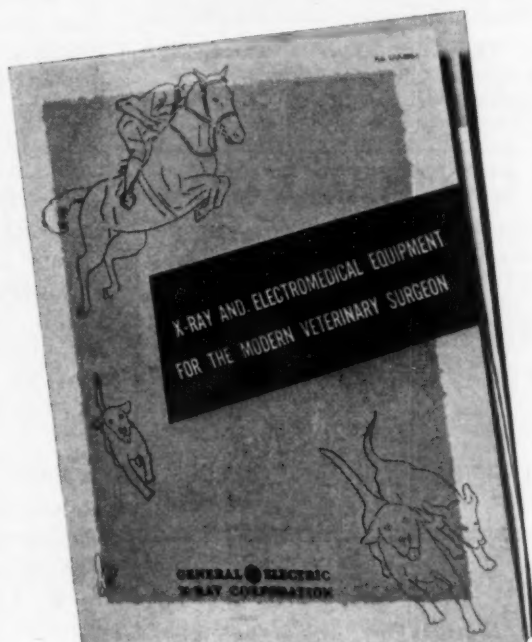
When the performance of a cow, for example, is not known, she is judged by certain body measurements and these are the assurance that she is expected to yield in

(Continued on page xxii)

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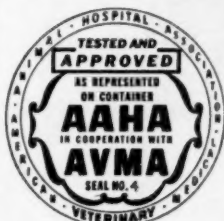


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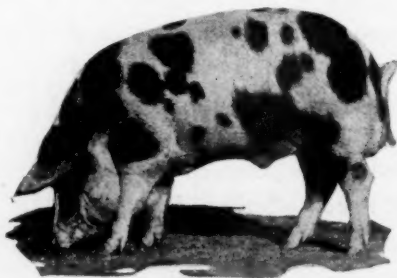
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**100 capsules \$4.00**

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## An' Related Topics

*(Continued from page xx)*

butterfat and milk. Another example is the judging of horses in the same way to estimate the probable speed and strength they will show when trained and put to work. Strangely the fastest and the strongest horses seldom win blue ribbons in the show ring. They win their decorations by working at the job for which they were bred. Of course, in both instances the performance of ancestors is taken into account. But how often this tricks the buyer is too well known to recount here.

The obedience test for dogs, as we see it, is a step in the right direction. It is a step toward judging an animal for what it can and does do for the owner's pleasure or profit. We are for the obedience test and the breeding of dogs for the brains they have as well as for fanciful profiles that mean less in this practical world.

### German Horses

Long before World War I, Germany was one of the leading nations in the production of horses for military purposes. Wilhelm I and Wilhelm II took personal interest in the breeding of horses and military horsemanship. But what is less generally known is that Hitler was increasing the use of horses in his army while England, France and, to some extent, the United States were discarding them. The result was, "Who knows what?" An adage, based upon experiences of World War I, widely circulated throughout the world, states that the nation that goes to war horseless is "licked from the word go." Perhaps the events of the next few years will settle the question.

### So, Out Goes "Clinic" for Us

Purists of the medical profession are all "het up" over the misuse of the word "clinic" in the literature. Clinic is derived from *kline*, German for bed, and those who are offended by the distorted philology of modern usage insist that nothing is clinical unless it is done at the bedside. Inasmuch

*(Continued on page xxiv)*



## YESTERDAY:

... a pathological mystery



## TODAY: *spectacular recovery!*

**T**hat Parturient Paresis (Milk Fever) is no longer a pathological mystery is an outstanding and lasting tribute to the veterinary profession.

Although it has been only a few years since the etiology of the disease was clearly defined as an acute hypocalcemia, the therapeutic results obtained thus far with parenteral calcium compounds have been little short of dramatic.

Calcium Levulinate, Injectable—Abbott's contribution to more efficient calcium therapy—in addition to offering the convenience and safety of *intravenous* technique, overcomes two shortcomings of certain other calcium compounds. First, it requires no stabilizing agent. Second, it has a relatively higher calcium content.

Thus the 15% w/v solution of Calcium Levu-

linate, Abbott, is approximately equivalent in calcium content to 25% w/v calcium gluconate; or one 350-cc. container furnishes the same amount of calcium as 87.5 Gm. calcium gluconate.

In parturient paresis of cows or in the treatment of other blood calcium deficiencies, the dose of Calcium Levulinate is 250 to 350 cc. depending upon the size of the animal and the duration and severity of attack. The dose may be repeated, when indicated, in one to two hours. In preventive treatment, 150 to 250 cc. may be administered at the time of calving.

Calcium Levulinate, Injectable, Abbott, is stable, sterile and ready for use. It is supplied in 350-cc. bulk containers, singly, or in boxes of 6. Abbott Laboratories, North Chicago, Ill.



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The Originators of Packaged Medicines for Veterinarians  
**HUDSON, N. Y.**

**An' Related Topics**

(Continued from page xxii)

as animals have stalls, corrals, kennels, cages, sties, coops, nests, niches, pastures and so on, and no *kline* except straw, sawdust, peat and newspapers, a lot of veterinary literature has to be revised—forsooth.

What these critics of the "lesser lights" (as one of them calls the medical rabble) do not admit is that the modern dictionary that would restrict definition to derivation would be about as up to date as the Talmud, and about as useful.

**Calories of Common Foods\***

Arranged on a descending scale, the energy value (calories) of the more common foods we eat is, per pound:

Hog's lard . . . . .	4,200	Pork sausage . . . . .	2,600
Salt pork . . . . .	3,600	Sugar . . . . .	1,860
Margarine . . . . .	3,500	Ham . . . . .	1,800
Beef suet . . . . .	3,500	Ham (fresh) . . . . .	1,700
Pecans . . . . .	3,400	Wheat (flour) . . . . .	1,650
Butter . . . . .	3,320	Corn meal . . . . .	1,650
Walnuts (Calif.) . . . . .	3,300	Capon . . . . .	1,450
Bacon . . . . .	2,900	Turkey . . . . .	1,435
Cheese . . . . .	2,100	Chicken (fat	
Pickled beef . . . . .	2,110	hens) . . . . .	1,200
Corned beef			
(plate) . . . . .	2,025		

There are noteworthy variations in the caloric value of different cuts of meat, kinds of flour products, and types of cheese, and also in the various species of farm fowls. The variations do not, however, materially change the rating given above, for practical purposes.

Cereals average around 1,650. Fish range from 230 for oysters to 950 for salmon. The caloric value of whole fresh milk is but 325, and skimmed milk only 170. The superiority of cheese as a food over whole milk is shown by the values of the different types which range from 1,600 to 2,100 per pound.

The caloric rating of fresh beef (whole carcass) is given as 1,000, but within the beef carcass are parts ranging from 550 (brains) to 3,500 (suet). Veal ranks low, from 575 for liver to 790 for loin, and the

\*From The Soldier's Mess, by Col. Sherrard Coleman. Quartermaster Corps Subsistence School. Bulletin No. 27. Series X.

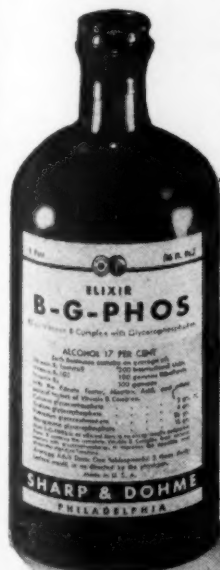
(Continued on page xxvi)

# A vitamin-mineral tonic for your small animal practice



**E**LIXIR 'B-G-PHOS' is indicated in the anorexia and sluggish digestion so frequently encountered in small animals during the winter months, . . . for Elixir 'B-G-Phos' supplies the whole Vitamin B-complex from natural sources together with glycerophosphates. It stimulates the appetite, improves digestive functions and aids in correcting B-complex avitaminosis.

Elixir 'B-G-Phos' may be administered over long periods, thus insuring adequate intake of all factors of Vitamin B-complex. For optimum utilization of these factors, proper mineral intake is important, especially manganese. This mineral and others are incorporated in Elixir 'B-G-Phos.'



**EACH FLUIDOUNCE OF ELIXIR  
'B-G-PHOS' CONTAINS:**

Vitamin B <sub>1</sub> (natural)	200 International Units
Vitamin B <sub>2</sub> (G) (natural)	100 gammas Riboflavin
(equivalent to approximately 16 Sher-	
man-Bourquin Units)	
Vitamin B <sub>6</sub> (natural)	100 gammas
with Filtrate Factor, Nicotinic Acid, and	
other natural factors of B-complex	
Calcium Glycerophosphate	2 gr.
Sodium Glycerophosphate	4 gr.
Potassium Glycerophosphate	1/4 gr.
Manganese Glycerophosphate	17%
Alcohol	

Supplied in pints and gallons

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### Books and Magazines

DOG SENTIMENT CARDS for office wall, set of 12, 60 cents. *Judy's Dog Encyclopedia*, all dog subjects, \$5. *Dog World* monthly, \$2 for one year; \$3 for 2 years; \$5 for 5 years. JUDY PUBLISHING COMPANY, 3323 Michigan Blvd., Chicago, Ill.

### For Sale

MIXED PRACTICE—dairy and small animals—in fashionable residential section 45 miles from New York City. Position as town veterinarian available. Reasonable. Address: "ET," c/o Journal of the AVMA.

PRACTICES, locations and partnerships, furnished and sold—all states. F. V. Kniest, 1537 S. 29th St., Omaha, Neb.

ONE OF THE LARGEST, most modern and oldest established small animal hospitals in southern California. Equipment complete in every detail. New buildings are tiled throughout and are of semi-modernistic design. Over 20,000 sq. ft. of ground space. Conservative inventory of equipment alone totals more than \$11,000. Hospital now doing a very substantial business. To be sold with or without real property. If sold without real estate, purchaser may have a good long-term lease. Detailed description, pictures and price sent at request of financially qualified buyers. Write or wire Mr. E. Lannen, 53 S. Euclid Ave., Pasadena, Calif.

SMALL ANIMAL HOSPITAL. Good established business. Coulter's Dog & Cat Hospital, 5258 W. Pico Blvd., Los Angeles, Calif.

FAIRLAWN ANIMAL HOSPITAL and Boarding Kennel. Six-room hospital, six-room apartment, two-car garage, seven-room kennel. Approximately seven acres of land on main highway. Modern and in top repair; facilities for approximately 100 small animals completely equipped. Mixed practice. Owner in draft. Will sell for one year's gross income averaged over past five years. Buyer to finance. Personal or agent interview preferred. Address: Dr. C. Thibeault, 16 Lowell St., Wakefield, Mass.

### Wanted

YOUNG VETERINARIAN, single, with good knowledge of chemistry to take charge at once of experimental work on purebred horse ranch in southern Arizona for medical products company. Excellent living quarters and board furnished; practice permitted on side. Good future for right man. In replying state salary wanted. Address: Mr. Bexell, Lanteen Medical Labs., 900 N. Franklin, Chicago, Ill.

GRADUATE VETERINARIAN for large and small animal practice. State qualifications, references and salary expected. Address: "PO," c/o Journal of the AVMA.

### Position Wanted

1941 GRADUATE. Competent; had summer experience in mixed practice. Pennsylvania or New York preferred. Address: "UK," c/o Journal of the AVMA.

## An' Related Topics

(Continued from page xxiv)

meat of the sheep ranges from 1,350 for the breast of lamb to 1,500 for the side of mutton. Lamb loin without kidney or suet has 1,540 calories per pound. According to the cut, pork stands at the top of fresh meats in caloric values. The range is 1,633 for chuck, ribs and shoulder to 1,800 for the middle cuts.

In the study of energy values of the food we eat, the nuts make an extraordinary showing. With peanuts at 2,600, Brazil nuts at 3,200, California walnuts at 3,300, pecans at 3,400 and peanut butter at 2,850, it is evident that the popularity of this sort of food is not accidental.

### Land Utilization in Europe

England is more agricultural than is generally supposed, according to a survey<sup>1</sup> of the utilization of land for food production in three European countries. The percentage of land to total area utilized for farming is shown in the following table:

USE	ENGLAND*	FRANCE	GERMANY
Farming	67	67	61
Forest	6	20	27
Waste†	14	10	4
Not farmed	13	7	8

\*Includes Wales.

†Includes rough grazing.

The importance of these figures lies not so much in the arithmetic as in the public interest such surveys now arouse, not only in Britain, but all over the world. They are the barometer of the food supply.

<sup>1</sup>By P. Lamartine Yates. Report of an inquiry organized by Viscount Astor and B. Seeborn Rowntree. Longmans, Green & Co., Ltd., London, New York, Toronto, 572 pages. *Vide*, The Veterinary Record, 111 (Feb. 8, 1941), p. 81.

(Continued on page xxviii)

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- 1) Dates and places of AVMA meetings chronologically tabulated, beginning with 1863.
- 2) Directory of all presidents, secretaries and treasurers since Association's founding in 1863.
- 3) Official Roster for 1940-1941, including officers and committees; special representatives; resident state, territorial, provincial and foreign corresponding secretaries; Women's Auxiliary; House of Representatives, as of March 1, 1941; and other features.

In addition, this valuable document contains the new Constitution, Administrative By-Laws and Code of Ethics as revised and adopted at the 77th annual meeting in Washington, D. C.

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ASSOCIATION, 600 S. Michigan Ave.,  
Chicago**

**An' Related Topics**

(Continued from page xxvi)

**A Practical Way to Test Urine for Sugar**

The micro-reagent known as galatest furnishes practitioners a means of detecting sugar in the urine instantaneously. Its value lies not only in the ease with which

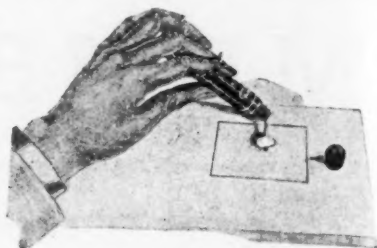


Fig. 1. Pour a small pile of the powder on a piece of white paper and flatten it with the bottom of the vial.

the test can be made but also in its accuracy. A bit of the powder on a piece of white paper or glass and a drop or two of the urine to be tested trickled upon it with a common eye dropper give immediately a quantitative determination in urine containing less than 1 per cent of sugar. The determination is made by simply compar-



Fig. 2. Drop a few drops of the urine upon the powder with a medicine (eye) dropper and compare the coloring produced with the color chart. The reaction occurs in a few seconds.

ing the intensity of the coloring produced with a graded color chart furnished with the product.

Galatest is demonstrated and used in schools of medicine and of nursing and is widely employed by physicians, nurses, veterinarians, and laboratory technicians for speedy detection of urine sugar. Moreover, it is used extensively by diabetic patients to keep themselves informed on the progress of the treatment they are taking. This novel powder is faster and much cheaper than any other test according to an article

(Continued on page xxx)



# TENDINITIS

## in the horse

**T**REAT such conditions with good, warm packs of Antiphlogistine.

Its application promotes more rapid absorption of the exudates and tends to prevent thickening of the parts.



*Antiphlogistine*

*Sample on request.*

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Hill Packing Co., Topeka, Kan.

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Committee on Foods  
American Animal Hospital Asso.  
In cooperation with  
American Veterinary Medical Asso.

## An' Related Topics

(Continued from page xxviii)

recently published in the *American Journal of Technology* (Nov. 1940). It checks perfectly with Fehling's and Benedict's tests, and should certainly become the popular urine-sugar test of the veterinary hospital.

### Canine Casualties of the War

The National Air Raid Precautions Committee organized by the National Veterinary Medical Association of Great Britain and Ireland provides ambulances and stretchers



—From Our Dumb Animals.

Salvaging an air-raid casualty.

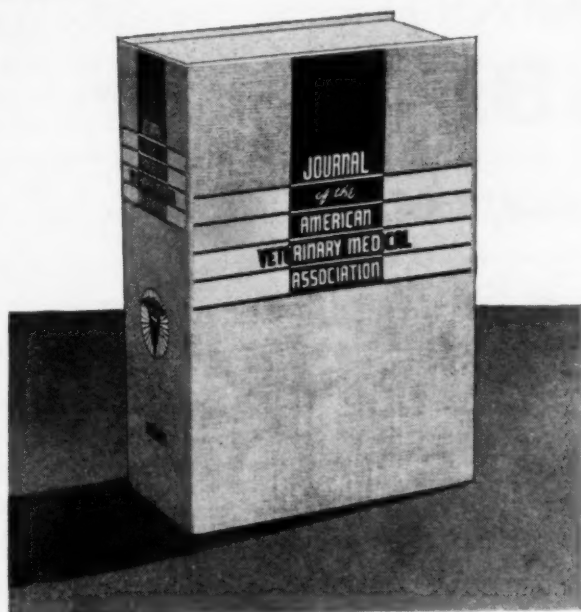
for animals injured in bombardments by the German air service.

From continental sources come special directions for processing dog and cat meat for human food and vague reports to the effect that the keeping of dogs as pets is forbidden.

### Sharecroppers Improving

With some financial aid and good advice from the FSA, 1,500 sharecroppers on the delta lands of Missouri stocked their larder

(Continued on page xxii)



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affords an accurate, instantaneous and inexpensive means of making routine tests for

### Sugar in Urine

Now at the disposal of members of the medical and allied professions.

Veterinarians will find Galatest useful in their practice for the quick detection of incipient or established cases of canine diabetes.



For particulars address:

The Denver Chemical Mfg. Co.  
163 Varick Street, New York

## An' Related Topics

(Continued from page xxx)

with \$250,000 worth of self-produced food. In previous years these families were homeless. Through the aid and encouragement given, they canned an average of more than 81 cans of food per person, besides dried fruit and vegetables and potatoes they stored. Out of the \$53,000 loaned to them to buy cows, \$11,000 was repaid during the year.

### Page Herbert Hoover

According to the London correspondent of the AMA, food shortage in Belgium is acute. The weekly allowance for each person is:

Margarine .....	1 3/4 oz.
Butter .....	1 3/8 oz.
Meat .....	4 oz.
Bread .....	3 1/2 lb.
Coffee .....	2 1/2 oz.
Rice .....	1 3/8 oz.
Potatoes .....	7 1/2 lb.
Oil .....	1 3/4 oz.
Skimmed milk .....	6 1/2 pt.

Small as these allowances are, they are not always obtainable. The figures were taken from a Belgian newspaper published under German censorship.

### Adios, My "Frans" of the Radio Audience

"Blinky on the Blink?" is the title of an editorial in the J.A.M.A. Dr. Blinky is the *hombre* who is said to have amassed a large fortune preying upon the victims of chronic ailments through nationwide radio broadcasting and who lost his suit against the AMA for libel. When driven from the air in this country, he went across the Mexican border with his 180,000-watt station (XERA at Villa Acuna) to carry on with his advertising program. But, as of March 29, 1940, under an international agreement, that privilege, too, was taken away. Result: The federal District Court at San Antonio adjudged the doctor a bankrupt, January 31, 1941.

The only real blue bloods in the world are lobsters, snails and oysters.—*Pathfinder*.

# *The New Requirements*

for the manufacture and testing of rabies vaccine constitute a final answer to the critics of vaccination as a means of controlling rabies, because under these requirements no rabies vaccine can be marketed until it has been shown that it is capable of inducing a good degree of immunity to the virus of rabies.

The most important thing about the development of a usable testing procedure is that it completes the last link in the chain of evidence in support of vaccination. Experienced veterinarians have long felt that field results following the use of rabies vaccine left little to be desired. Every scientific body in the world which has made a careful study of rabies control has recommended vaccination of dogs combined with appropriate sanitary police measures in those areas where infection is known to exist.

The practitioner is completely justified in continuing to recommend routine annual vaccination as a means of controlling rabies.

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# ASCORBIC ACID SOLUTION

Experimental and clinical work conducted by the University of Wisconsin Experiment Station would indicate that—

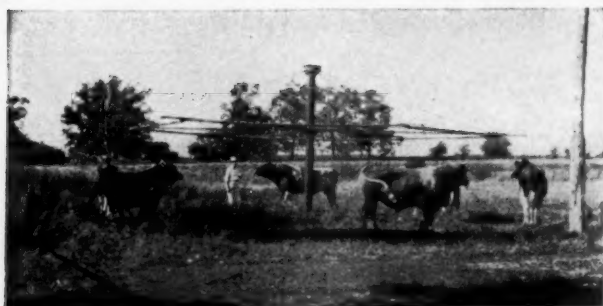
## **in bulls . . .**

Ascorbic Acid in doses of  $1\frac{1}{2}$ -2 Gm. administered subcutaneously to slow-breeding bulls resulted in—

- 1—Greater sexual interest
- 2—More viable sperm

## **in cows . . .**

Ascorbic Acid in 2-Gm. doses administered subcutaneously to "hard-to-settle" cows and also to "shy breeders" resulted in a high percentage of pregnancies.



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